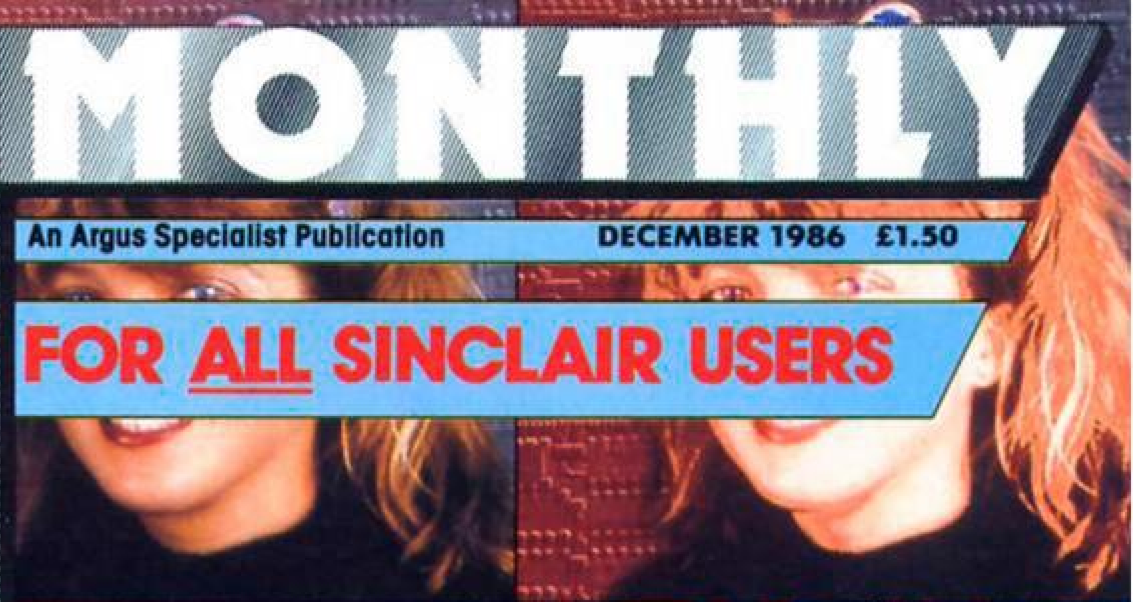
ZX COMPUTING MONTHLY

An Argus Specialist Publication DECEMBER 1986 £1.50

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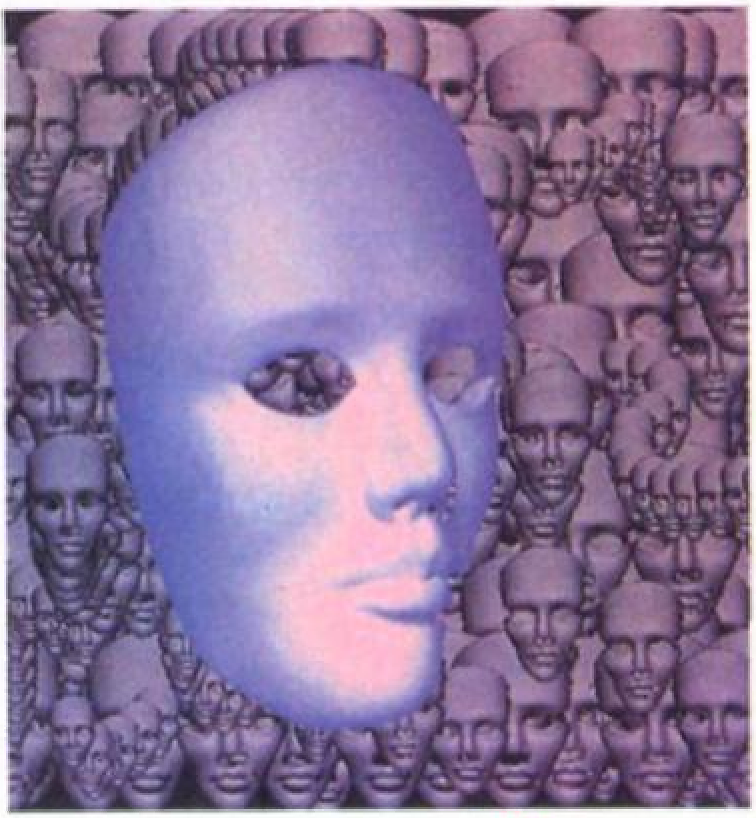
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Trailblazer

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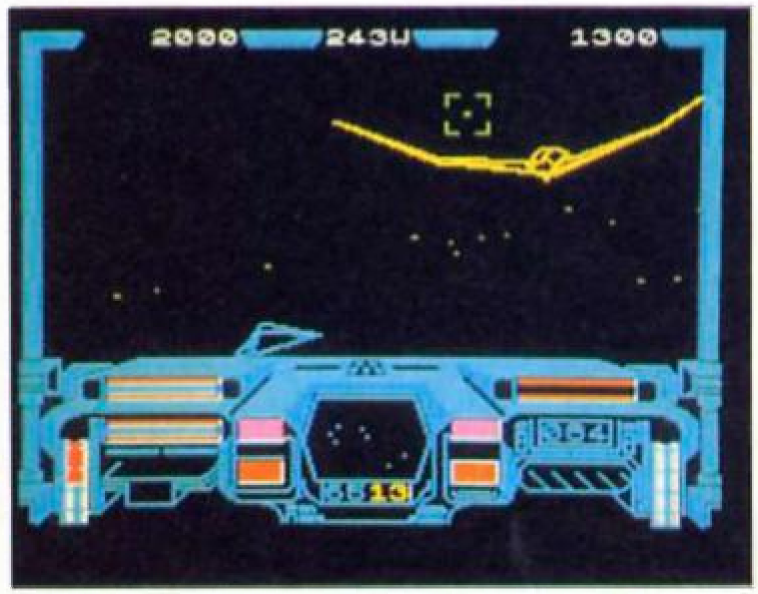
The face of state of the art graphics (10) created using Pluto Designer software.

COMPETITIONS

REGULARS

PROGRAMMING PROJECTS

SOFTWARE REVIEWS



Starglider: The new Elite? See news (6).

This month's cover was created with a Quantel Paintbox. A special thanks to BPCC Video Graphics for their assistance.

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NEWS

On Golden Square

Firstly a big thank you to all the ZX readers in Britain and overseas who put pen to paper and filled out the readership survey. Questionnaires have been flooding into our offices at Golden Square and your answers are now being collated on computer. We'll be publishing our findings in next months issue.

We do value your opinions and ideas and the information gleaned from the survey will have a direct effect on shaping the future of ZX.

As you can see from our cover this month's issue is devoted largely to graphics with reports on what's happening at the forefront of computer graphics and animation and Toni Baker shows what the 128 is capable of in the animation department.

The cover was created at BPCC Video Graphics in Covent Garden, London with a Quantel Paintbox. We were given a guided tour of the paintbox's virtually infinite range of graphic effects such as "colour mapping" and "embossing". Ironically for a machine of such power some of the best visual effects can be obtained from humble origins. The background of the cover shots for instance, started life as a circuit board before being colour mapped (using an on screen palette which can contain any spectrum of colours you want from the millions at your disposal), then embossed (to create a relief effect).

If required, tones from the original picture can be taken directly onto the palette and recombined to creat specific colour effects.

The techniques of machines like the paintbox eventually filter down for use by home micro owners and there is news of an impending price breakthrough in Spectrum graphics utilities. Mikrogen are putting together an icon driven graphics package for under £10. It is provisionally titled Digital Grafitti.

In the next issue we will be presenting useful routines from top programmers including Pete Cooke, of Tau Ceti fame, and the programmer of Antiriad for the Spectrum, Chris Strangroom, as well as Steve Turner revealing a few inside secrets of the making of his soon to be released game.

The January issue will be available on December 23rd.

Starglider due for take-off

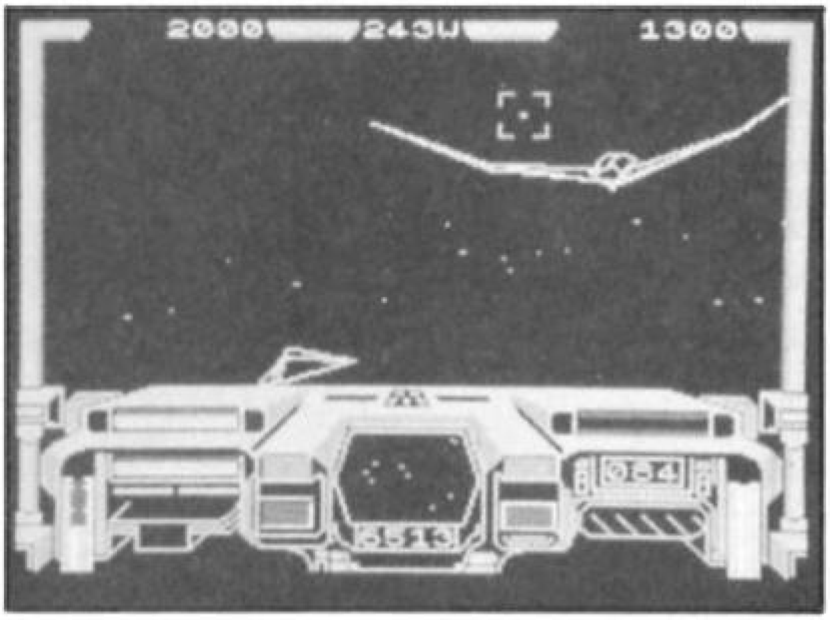
Elite's current status of being the most ambititious program ever on the Spectrum could be in jeopardy judging from a sneak preview of Rainbird's Starglider.

Due out at the end of November, Starglider features impressive use of animated 3D vector graphics. It's an arcade style flight simulation that like Elite can be played as a shoot-em-up or as a strategy game with alien blasting as a sideline.

To give you some idea of the complexity you could be getting into the game comes complete with a 64 page novel packed with playing hints as well as the basic instructions.

The mission you have been given is to do battle against the invading Egrons and knock out their flagship — Starglider One but as you would expect the route to success is paved with deadly alien craft and numerous sub plots. One particularly tricky task is gaining access to a computer by manoueuvering your ship down inside a missile silo.

But it's the graphics that seem set to startle Spectrum games players. The landscape and air space are packed with a huge variety of peculiar nasties, on the surface there are Stompers, huge two legged machines that tread heavily around the scenery and Walkers, equally huge and deadly but a little more balletic. Once unleashed, the Egron Starglider flaps its wings very realistically as it homes in on you.



The game will be packaged with both 48K and 128K versions on one cassette. The 128K version has extras such as music, digitised speech and additional missions. Starglider will cost £14.95. Expect a full review in the next issue.

New BASIC Compiler

HiSoft have released a "fast floating point compiler" compatible with all Spectrums. The company say it's faster than anything currently available and that "Programs up to 30K in length may be compiled without needing to use cassette tape of microdrives."

Hi Soft Basic uses single letter commands to compile and can process almost all of the Spectrum's Basic except direct commands like LOAD and SAVE. Swapping between compiled code and normal BASIC is said to be "very straightforward".

If you follow the manual correctly and are careful with your coding before compiling Hi Soft say, "speed increases of up to 80 times that of the build in BASIC may be achieved."

HiSoft Basic costs £15.95 and we'll be putting it to the test in next months issue.

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Let the buyer beware

After years of watching Christopher Lee's D.I.Y. blood transfusions as Count Dracula in countless Hammer movies, the British Board of Film Censors has now sat down to pass judgement on the computer game.

CRL's text and graphics adventure, Dracula, was submitted to the board after fears were raised that it might be unsuitable for children. The result of the Censors deliberations was to slap a 15 certificate on it.

Now the precedent has been set we can expect that most if not all games will have to be vetted in this way.

As a guide to the suitability of games for younger age groups it may be no bad thing, and of course from a software houses point of view a little notoriety never did sales any harm. So we can look forward perhaps to the first game to receive a Parental Guidance certificate, (although ironically children have been guiding their parents through games for years.)

CRL have not let all this controversy stem the flow of new titles and forthcoming releases include Murder of Miami, by Bored of The Rings author Fergus McNeil and Jason Somerville. The adventure is set far from the dingly dells of Middle Earth and is a who-dunnit mystery set on a boat off the Miami coast in 1930. Based on the novel of the same name by Dennis Wheatley, it costs £7.95.

Also set for December release is Samurai and as you would expect from the title it's a Ninja combat game with the twist that your adversaries are deadly Buddhist monks who prefer karate chops and double edged swords to prayers and incense. Will a Religious Guidance certificate be in order for this one?

The Disciple

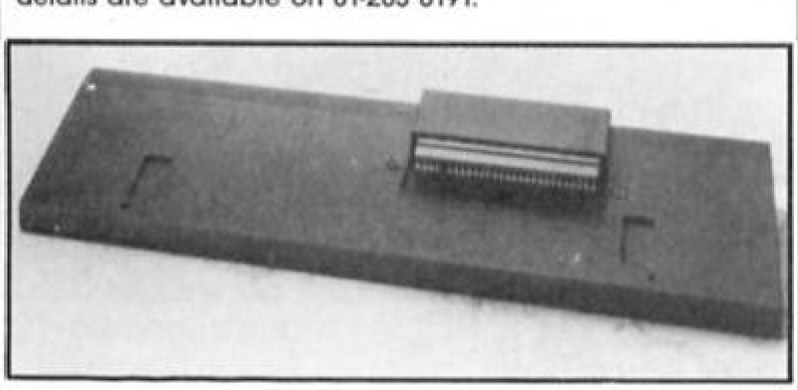
Miles Gordon are a new name on the hardware scene and their first product on the market is the Disciple, a multi purpose interface which acts as controller for disc, printer, dual joystick port and networks.

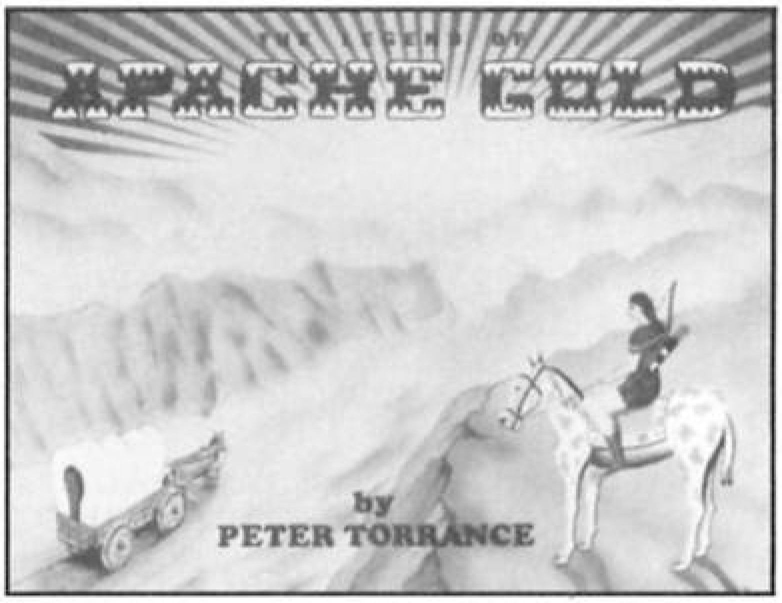
The Disciple bears an uncanny resemblance with the Interface One and it uses the same raised connector to fit beneath the Spectrum which leaves all the computers inputs and outputs open for access.

On the Disk Interface, Miles Gordon claim times on a 48K double density file of 3.5 seconds and a 7K screen load of less than half a second. The Disciple makes use of the Shadow ROM to avoid dipping into the Spectrum's memory and has the facility to save shapshot files. There is a Snapshot Button that allows you when working in double density to take as many as 16 snapshots.

The printer interface drives a centronics parallel printer and software is included so that the operating system can be customised to take into account what sort of drives, printer and discs you are working with. Two joystick ports are included (Atari standard) and two Network connectors allow up to 64 Spectrums to be in an Interface 1 type network.

It not only looks like Interface I, its also compatible with it so that any peripherals used formerly with the Interface I will work with the Disciple. A full review of the Disciple will be in next months ZX. The Disciple retails as £73.70+ VAT and further details are available on 01-203 0191.





Graphic Gold

Incentive Softwares Graphic Creator is now spawning commercial adventures. The first two releases on Incentives new Gold Medallion label will be Apache Gold (written by Peter Torrance author of Subsunk and Seabase Delta, who has turned his attention to a gold prospecting quest in the Wild West) and Winter Wonderland set in the Himalayas, where concealed from the outside world there is a lost civilisation, which you must put back on the map.

Gold Medallion Adventures will retail at £7.95 and Incentive will certainly have no shortage of submitted adventures in the future if sales figures are anything to go by. Ian Andrew, an Incentive Software director, informs us that worldwide sales of GAC have just topped the £1 million mark.

Static Buster

Static electricity gets blamed for an awful lot of malfunctions these days and if you are worried that it could be effecting your computer set up then you might want to check out Static Buster from Integrity Solutions. Backing up their argument that static can be damaging the company produce some wonderful statistic. . . . Did you know that simply walking across a carpet generates a 35,000 volt charge ? and even picking up a polythene bag can unleash 20,000 volts!

The Static Buster consists of a 'Static Potential Equaliser' which diverts static from the screen to a grounding point, anti static cleaning fluid and wipes. You will have to be picking up a lot of polythene bags near your Spectrum to justify the price of £49.95, and remember you may never get that balloon to stick to your jumper ever again. Integrity Solutions can be contacted on 0706 345835.



NEWS

Spectrum Games Top Ten

1	( )	Infiltrator	U.S. Gold
2	( )	Shaolin's Road	The Edge
3	( )	Computer Hits	Beau Jolly
4	(4)	Paper Boy	Elite
5	( )	Galivan	Imagine
6	( )	Fairlight II	The Edge
7	(2)	Trivial Pursuit	Domark
8	( )	Highlander	Ocean
9	( )	They Sold a Million 3	Hit Squad
10	( )	Crash Smashes II	Gremlin

Chart supplied by W.H. Smiths

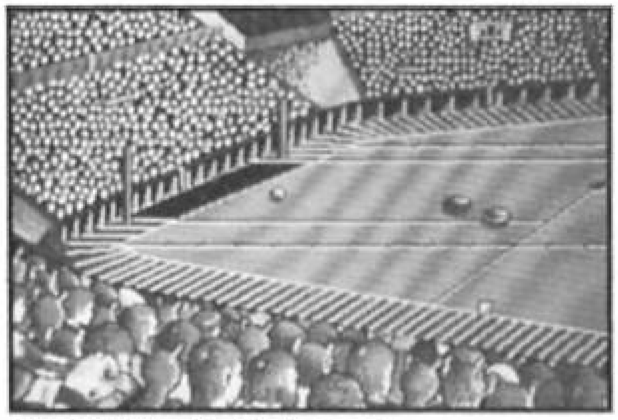
Another month, another Number One, with Trivial Pursuit being knocked off its pedestal by Infiltrator (to be reviewed next month).

There are no less than three compilations in the top ten and with more on the way from practically every software house that's got a back catalogue, we face the prospect of a Christmas chart dominated by old games in new packaging.

Music Machine

No sooner have Ram Electronics released the Music Machine than an independent users group has been set up. Called The Ram Pack the group plans to run on a subscription basis (£12) a year and publish a monthly magazine. Organiser Al Straker informs us that the club will act as a focus for Music machine users to solve problems, swop hints and tips etc. It is also hoped that some hardware upgrades will be available at minimal cost.

For further details send an A4 size SAE to The Ram Pack, 19, Sandringham Road, Willesden, London NW2 5EP.

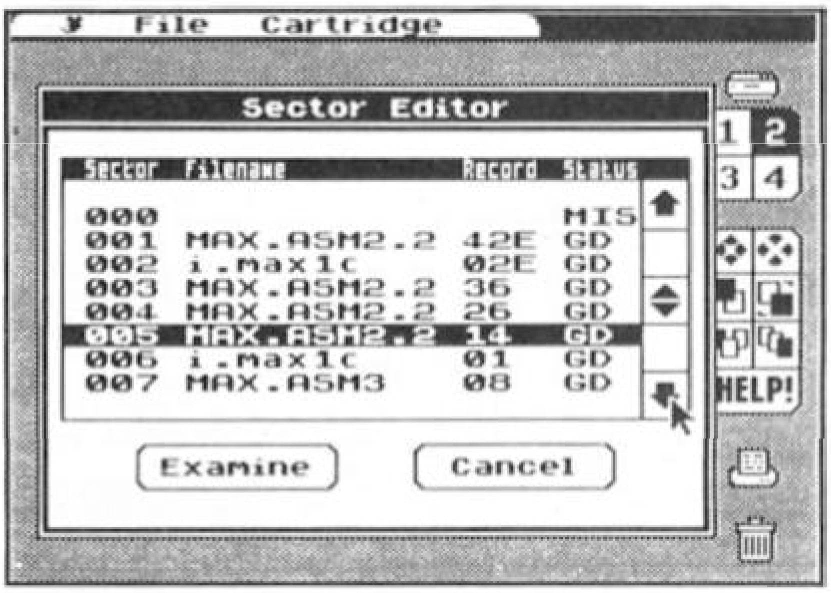


Xeno: *A futuristic high speed version of shove half-penny soon to be released by AnF (£8.95).*



Legions of Death: *Lothloriens latest wargame is set among the slave-galleys in Roman times. It will cost would-be ancient mariners £9.95.*

A screenshot from AMS's new MAX utility providing a WIMP environment for file management. It costs £14.95 and there will be a full review next month. AMS 0925 413501.



Gilsoft strike back

Gilsoft (The Quill) and Incentive (GAC) are now locked in competition for the adventure creator market and that's good news for the consumer as standards will continue to rise.

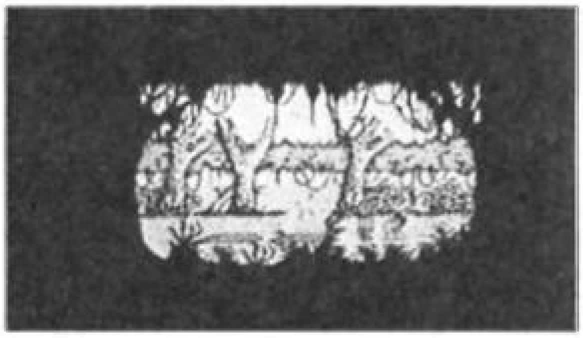
The latest from Gilsoft is The Professinal Adventure Writer with a new text parser, facilities to create psedo intelligent characters and text compression.

The PAW (as it will inevitably become known) will be in two versions for the 48/128K Sepctrum. An integrated package aimed largely at the 128 has the graphics and text editor on one menu and will allow an adventure using 110K of memory to be created on the 128.

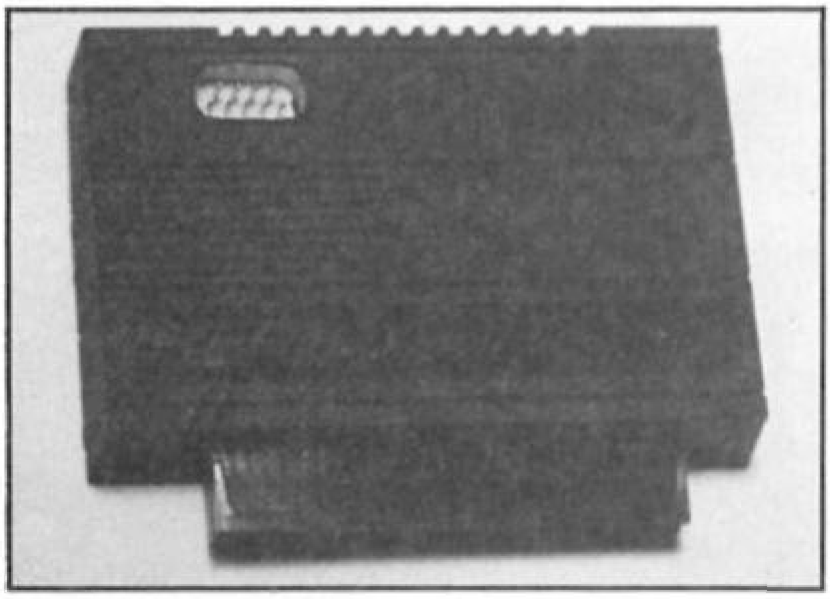
The second version is aimed more at the 48K Speccy and the graphics and text editors are seperate programs to allow maximum use of memory for actual adventure writing. The new shade routine is reputed to be able to fill the entire screen in 0.7 seconds. The versions will cost £22.95 each.

Also available from Gilsoft is The Press, a text compressor for use with the Quill which will retail at £6.95.

To make way for the PAW Gilsoft has reduced its prices for the Quill and Illustrator which now sell for £8.95 each.

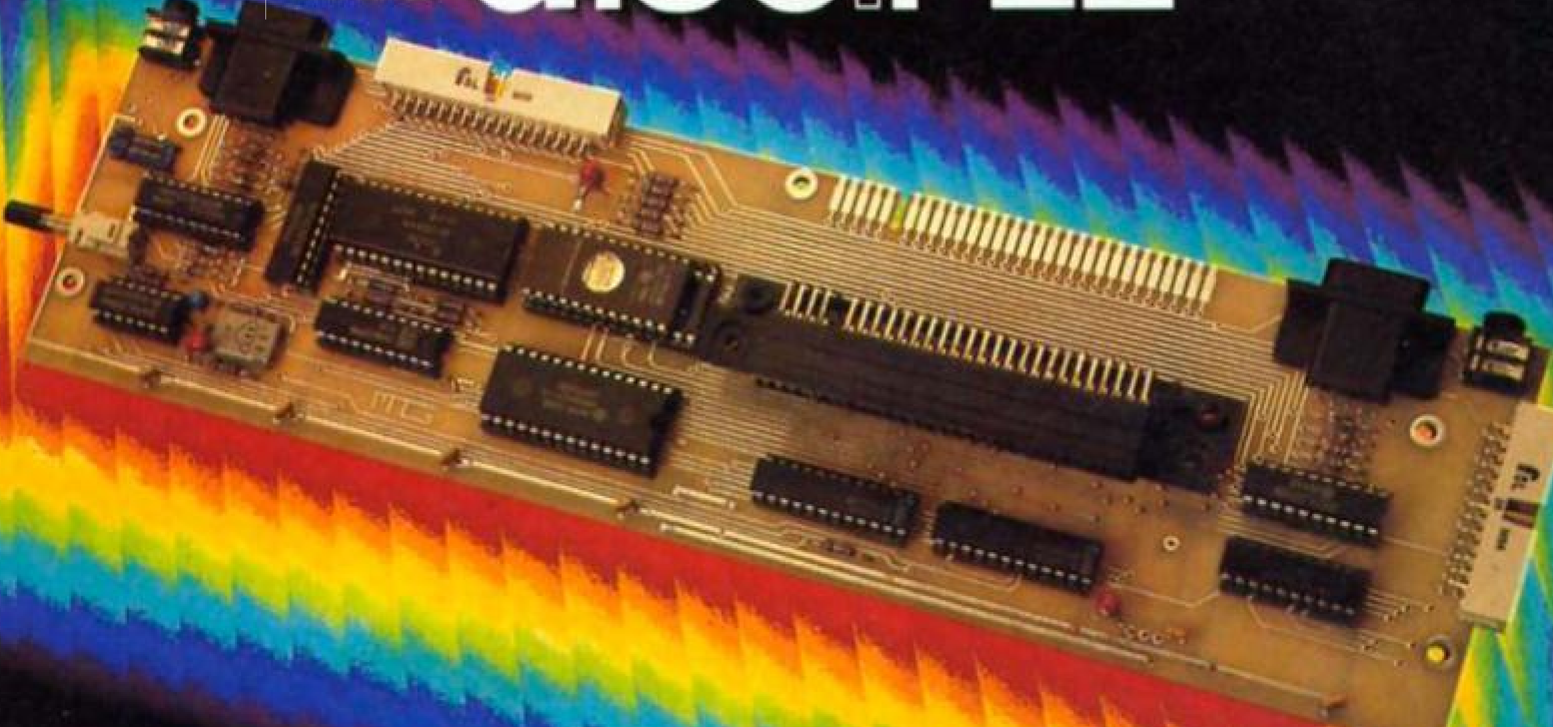


Tarzan: *A glimpse of the Ape-Man's jungle kingdom. CRL's Tarzan due for imminent release is priced £8.95.*



Kempston have responded quickly to the 128+2's new joystick configuration by bringing out a Kempston compatible interface (£6.95).

The answer to the Spectrum-users prayer
the DISCIPLE



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DUAL JOYSTICK PORTS
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- ★ Interface 1 Compatible



Use the disciple with any Spectrum – even the new Plus Two model.

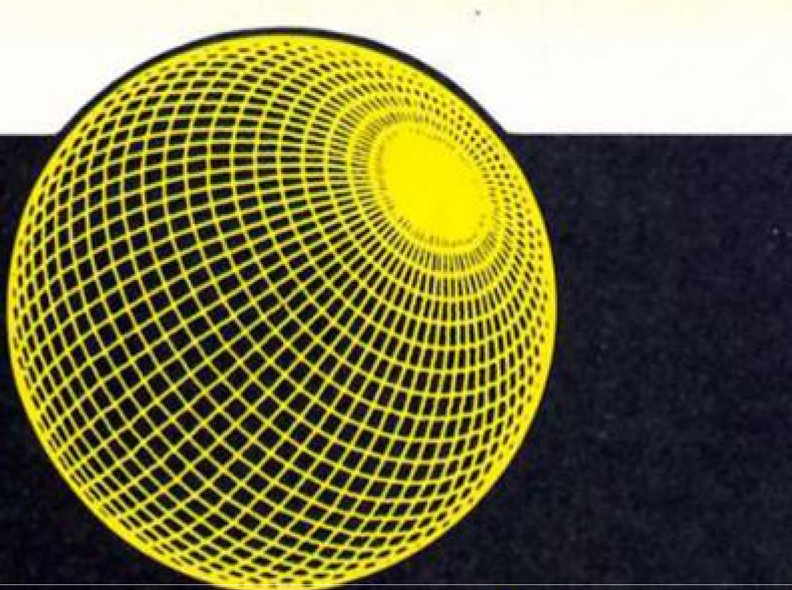
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Graphics '86



Created using Pluto designer software

Every year the Computer Graphics Show demonstrates the latest and best in graphics. This year ZX snuck in with its Speccy hidden up its jumper to see how it compares.

As I'm used to dealing mainly with humble home computers, I'd never been to the annual Computer Graphics Show before, dealing as it does with expensive, state-of-the-art computer hardware.

So, when I got there, the most surprising thing about the show was to see how reassuringly familiar all that "leading edge" graphics technology was. The machines on show might be faster than the Spectrum, and you can bet that none of them have to worry about attribute clashes, but a lightpen is still just a lightpen whether it's attached to a Spectrum or a £10,000 Graphics Rendering System.

The one piece of equipment that was most in evidence was the touchpad or graphics tablet. You've probably seen these before — they look a bit like one of those old Etch-a-Sketch drawing tablets, except that in this case it's hooked up to the computer and whatever you draw on the surface of the pad instantly appears on the screen of your TV or monitor. Just about every computer had a touchpad attached, in conjunction with a pen or a mouse in order to demonstrate their graphics capability.

Now, both touchpads and mouse packages are available for the Spectrum (from Saga and Advanced Memory Systems), and while these are obviously limited by the Spectrum's graphics handling ability, if you've used one on a Spectrum you can use one on an IBM or any of the other mega-expensive machines on show without being intimidated by the facilities they offer.

Many of the software packages also looked quite familiar. There were a number of powerful graphics utilities on show which not only sounded like something you might find on the Spectrum, but looked like it, too. Art System, Artstar, Pixel Engine and others might cost thousands of pounds, but they all use the same sort of screen layout/menu system as Firebird's Art Studio (or rather Art Studio uses the same layout as they do), so you'd feel right at home with them.

11,182,080 colours

Most of the customers who can afford this sort of technology are large businesses, so inevitably there were a lot of not terribly exciting graphs and bar charts on show. Personally I couldn't see the point of spending thousands of pounds on graphics equipment when all you do with it is plot a chart for UK sales of Guava — that's the sort of thing that you *could* do just as well with the Spectrum and a lot more cheaply.

One company announced their new SG-R system which is capable of high-res graphics featuring up to 11,182,080 different colours on screen all at once (compared to the Spectrum's eight!), and all they had on show was a picture of a food blender. Some people have got no imagination . . .

. . . mind you, some people have got quite a lot. Increasingly these days the main users of computer graphics equipment are television and film companies, and it's the artists and designers who work in these areas who are doing really interesting things with

Created using Quantel Paintbox



computer graphics. Richard Branson's Virgin empire already includes a games software house, and now they've started Virgin Computer Graphics who are currently doing some work for Thames TV.

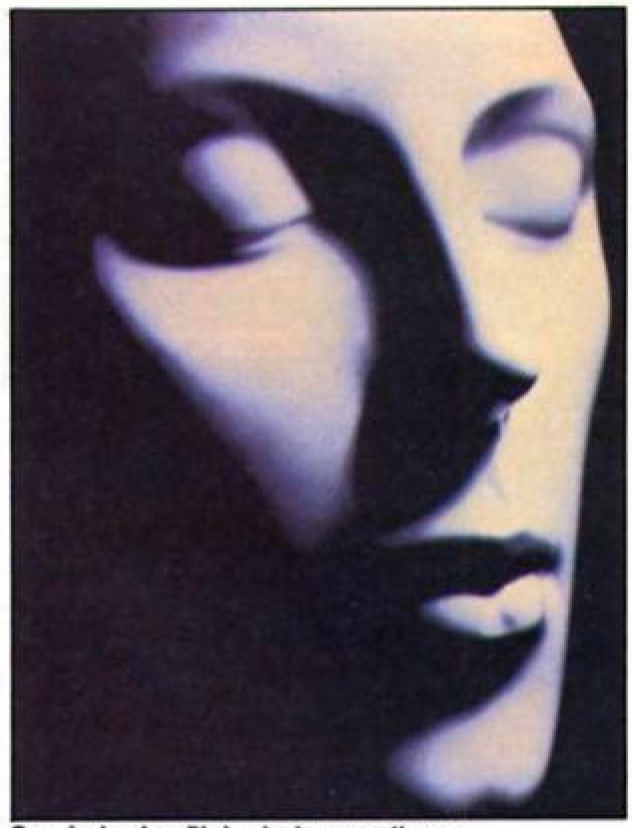
At the moment, most of the computer generated material that we see on our screen is restricted to title sequences at the start of programmes or short trailers for new programmes because of the cost of the equipment (some machines can cost up to £300 an hour to hire, and have got queues of people waiting to use them through to the end of next year). But it's perfectly possible to produce longer features (such as Disney's Tron) using this technology as long as you can afford it, and on the second evening of the show the Computer Animation Film Festival was held, demonstrating what computer graphics are capable of (and there's a report on the Festival further on).

Paintbox

But the star of the show, the stand which consistently drew the largest crowds, was the Quantel Paintbox. Quantel is a company which was set up specifically to develop computer graphics for use on television, and the Paintbox is their biggest success. There are 55 Paintboxes in use; fourteen of them are owned by the BBC and most of the others by film companies, producers of music videos and so on, and Quantel recently won two EMMY awards for technology from American television.

Using a simple touchpad and pen as your drawing device, Paintbox allows you to create and animate on screen virtually any sort of image that could be created using conventional artist's materials, whether it's chalk, oil paint, pen, pencil or whatever. The quality of the picture that you can achieve is so high that you can connect Paintbox to a video camera, freeze the video picture on the computer screen without any loss of quality (known as 'frame grab') and then just redraw whatever parts of the picture you feel like changing before re-recording the new image. Paintbox automatically adopts the same colours as those in the picture, so alterations are undetectable allowing you to virtually redraw reality!

All this hi-tech might seem a long way from your Spectrum or QL, but as someone said just recently, "the gap between today's minicomputer and tomorrow's toy is about five years". And as I've said, the hardware and software that was on show isn't ultimately that different from what we're used to on the Spectrum, or from the sort of machines that are just beginning to make their way into the upper end of the home computer market. So who knows, if Amstrad don't let us down it might be just a few years before we're all plugged into video machines and making our own music videos.



Created using Pluto designer software

Created using Pluto designer software



Computer Animation '86


Created using Quantel Paintbox

Things change very quickly in the computer animation industry. Last year's technical advances are this year's old hat. At the Computer Animation Film Festival, an offshoot of the Graphics '86 Exhibition, where the industry gathers to hand out its 'Oscars' I overheard a damning criticism of one of the nominations which was described as being "Very '85".

Animated computer graphics are now commonplace, having infiltrated every area of film, videos and TV. It's hard to think that there was a time when the opening titles of news programmes didn't have to somersault and turn inside out before becoming legible. In the general graphics section several familiar sequences were up for an award, notably the opening of Tomorrow's World (featuring Charley Chaplin and a human head that is being constantly transformed), and Channel 4's promotional interludes (remember the radar dish last New Year?). The winner was a promotional film for an advertising agency which those outside the industry are unlikely ever to see. It seems an oversight that there isn't the occasional documentary on TV about computer animated graphics in their own right rather than just seeing them as purveyors of products in commercials or title sequences.

In the commercial category the award was carried off by the frenetic 'Smarties 10 Per Cent More' advert against close competition from the Midland Bank (the one which combines live action with a digitised 'Griffin').

State of the art

It was the 'State of the Art' section that was perhaps the most interesting from the point of view of what will be filtering through to us as TV viewers in the near future. Gone are the days when zooming over wire-frame city scapes can impress. Now the concerns of those experimenting at the edge of what is technically possible centre on "flexible surfaces" and "modulated wave formation". To you and me it means the realistic representation of transforming solids and making the surface of the sea look believable. Another challenge is successfully representing the effects of light especially when refracted through glass — a technique known in the trade as ray tracing. The winner of this section reflected these concerns by first creating a totally believable shoreline landscape which was the setting for a solid pyramid of connected glass balls which pirouetted and inverted for our delectation to show that refraction of light was consistently authentic from all angles and while in motion. To show that even at the frontiers of computer animation there is still a place for humour, after various other effects had been displayed we returned to the original landscape where all the water in the ocean suddenly disappeared down a huge plug hole.

In a field where exciting new developments are the norm it won't be too long before old hat will be a solid glass trilby rotating through 360 degrees with perfect refraction of light. After all it's getting close to the time when even the best of this years' entrants will be frowned upon as being "Very '86".

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Spectre Comms Pack
Spectre Communications
£49.95
(or £99.95 with QCOM modem)

The Spectre communications pack isn't a modem as such, but when used in conjunction with one (and with the Tandata QCOM modem in particular) it offers a wide range of comms facilities.

The comms pack has been designed with the QCOM modem in mind, and is constructed in the same square, black, modular style as the Tandata range of comms equipment, but it can be used with most modems (including 1200/75 or 300/300 full duplex, and 1200/1200 in both full and half duplex — but it's probably wise to contact Spectre Communications if you're thinking of using the comms pack with anything other than a QCOM).

Setting up is simple; the pack is connected to the Spectrum via a ribbon cable (with an additional connector to allow use of printers etc), and the QCOM fits snugly on top of the pack. Your 'phone is plugged into the modem, and the modem into your 'phone socket. On the front of the coms pack, facing you, are two buttons — for 'mode' and 'line', selecting Viewdata or user to user mode (if you're using a different type of modem) and to seize the signal from the 'phone line. It's a minor irritation that neither of these are labelled, neither is there any indication of which position of the buttons selects which mode. This information is given in the instruction manual, but it's inconvenient, when first starting to use the equipment, to have to keep referring back to the manual.

Menus

Inside the comms pack is a 16K EPROM containing all the software you'll need to access Prestel/Micronet and other Viewdata services, as well as bulletin boards and a number of utilities for Uploading or Downloading frames, printing frames and so on. The QCOM modem can only access services which operate at 1200/75 baud (which includes Prestel/Micronet and many of the most popular boards and Viewdata systems), though of course other modems offer different baud rates.

Once power is turned on you'll be presented with the main menu displaying the various options available, and choosing an option from there will lead you to the relevant sub-menu. Most of these options are fairly standard, but it's very convenient to have them all gathered together on an EPROM and to have instant access to them, rather than to keep loading several items of software as is often necessary. And the menu system makes it simple to choose an option as it allows the software to do all the work for you.

Logging on

Logging on to Prestel/Micronet was relatively painless. The first attempt failed because I hadn't gotten the 'line' and 'mode' buttons sorted out but on the second attempt I was in straight away. Just for comparison I might add that it took me ages to figure out how to get the VTX 5000 modem (recommended by Micronet) working when I first got one of those, so two attempts on the Spectrum/QCOM set up is good going.

(Incidentally, the Spectre pack is the only unit so far approved by Micronet for use with 128 models of the Spectrum).

Getting onto a couple of bulletin boards proved a bit trickier, but after a little perseverance the manual grudgingly let me have the explanation I was looking for. As a matter of fact, the Spectre manual is better than most hardware manuals, and covers most of the available options in reasonable detail, but it still seems to assume a little more than it ought to.

On the whole though, I found the two units fairly simple to use. The system of menus takes a lot of the fuss out of using them and they gave me fewer headaches than most items of comms equipment do. If you want a modem solely for accessing Prestel/Micronet then you could opt for the cheaper VTX 5000, but then you really are limited to just that service. Buying a combination like the Spectre/QCOM set up also allows you to access a great range of interesting (and often free) bulletin boards as well. Even them the combined price of £99.95 probably isn't the lowest you could find, but the convenience of having the comms pack eliminates so much of the fuss that seems to come along as standard with modems it's probably worth it — especially if you're new to comms.

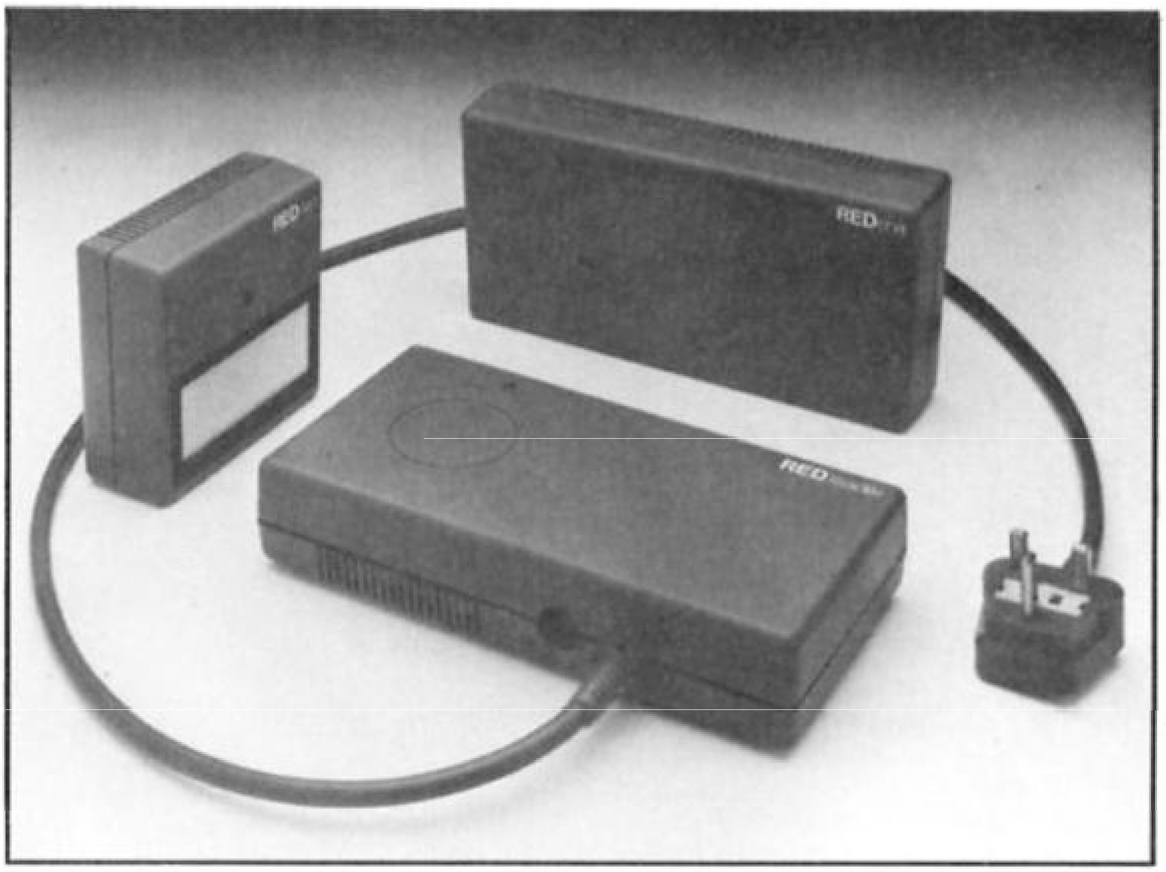
Further information from Spectre on 09315-362, or Micronet 800 on 01-278-3143.

Spectre Comms Pack with QCom modem.



RED BOXES

Carol Brooksbank courts domestic chaos to try out the Red Boxes home automation kit.



Red Boxes Starter Pack
Red Boxes
£129

What is your Spectrum doing while you are asleep, or out of the house? Not a lot, I suspect, unless you are an electronics wizard. But it could be the key to a system which protects your home against intruders, opens the garage door, turns a light on when you walk into a room, or anything you can think of, so long as you can plug the appliance you wish to control into the ring mains.

The Red Boxes starter pack contains three modules, Red Leader, Red One and Red Two. Despite the awful names, it is a very ingenious system. Red Leader is the microcomputer which controls the system, and it uses the Spectrum as its monitor as a programming terminal. After programming, it is disconnected from the Spectrum, leaving the computer free for normal use, and runs the system independently. The program is retained until power to the controller is switched off. Red One is a slave switching device, incorporating a 13 amp socket, plugged into the ring mains with the appliance to be controlled connected to it. Red Two is a slave infra-red sensor, also plugged into the mains, which detects movement in its vicinity by responding to the change in heat levels. The link between the controller and the slaves is the mains ring, whose cables carry the messages between them. This makes the system very flexible and easy to install. The only electrical expertise needed is the ability to put a plug in a socket and switch on.

Red Leader

To program Red Leader, you connect it to the Spectrum via the cassette sockets. LOAD "" is entered, and switching on Red Leader causes it to download its control program to the Spectrum. The handbook could be more helpful here. It matters which way the jackplugs are connected to the Ear/Mic socets, but the handbook does not say so, or tell you which is which. Get it wrong and the program crashes.

Each slave device has a unique code number, known only to the owner, which must be entered into the control program. Only a burglar or an expert hacker could tell you whether this, coupled with the random coding of messages between devices, makes the system 'amper proof. I am neither, so I will take the manufacturer's word for it, especially as the rest of the system performs as they say it should.

The built-in clock is easily set, and devices can be programmed to go on and off at specific times, or can be linked together, so that a light or an alarm connected to Red One could go on when Red Two detects movement. They can stay on for a specified period, until a particular time, or until switched off manually. Operations can be performed once or repeated daily.

The Spectrum screen shows the current "ON" or "OFF" status of all devices, and the times and links programmed. The program can be saved to tape but, again, the handbook is less than helpful. When you enter the KEEP (save) command, the screen goes blank except for a cursor at the top, there is no response to the keyboard and the Spectrum emits strange buzzings. Since the handbook neglects to say that this is normal — the program is being downloaded to the Spectrum — you assume a crash and unplug everything. After a third try you decide to let it go on and see what happens, and eventually the buzzing stops, and the screen prompts for the SAVE operation appear.

Red Basic

For more complex control, incorporating random switching, changing links between devices etc., Red Leader has its on built-in BASIC. There are no Spectrum keywords used; commands must be spelt out in full. In addition to the common BASIC commands, there are special ones like TELL, used to change the ON/OFF status of a device, or INSTALL, to link a new device to the system. The date can be programmed, and incorporated into instructions. The status of devices can be read and returned as a string. It took me some time to discover that the bug in my program was caused by the ON string being "ON". Perversely, On when used with the TELL command has no space. Despite such small irritations the BASIC is very powerful, and only your own programming ability limits the complexity of the systems you can devise.

There is no doubt that efficient and sophisticated automation and security systems can be developed with the Red Boxes, but I have some reservations. One is cost. There is really very little that you can do with the unexpanded starter system. Mounted 2m above floor level, Red Two can detect human movement up to about 4m away in a direct line, decreasing as the angle sharpens. Most rooms would require at least two, covering the door and window areas, for real security. At £34.95 each, I will leave you to work out the cost of total cover for your home. Each Red Two needs its own power point, which would make it impractical in most houses I have been in. Red One could be used for an alarm, but if you also want to turn lights on and off to give an impression of an occupied house, you will need more of those at the same price. It may be possible to make a less pricey system, using window and door switches and pressure mats the manufacturers are developing, and less Red Twos, but no details or prices are available yet.

The red boxes are smart but, dotted around your home — some of them 6ft up the walls — with their bright red cables trailing to the nearest power point, will hardly blend inconspicuously into your decor. The system will probably appeal most to someone venturing into home automation, who can expand it gradually, or to someone interested in networking computers, because an RS232 device is also planned. No details are given, but it suggests possibilities for networking with no linking cables other than the ring mains.

This is an interesting system, and great fun to use, but the £129 for the starter pack has to be seen as the first of many payments if a practical system is to be put together.

```
Red Control                              13:45:23

N Device  Sta  On    Off   Time  T  RA

1 LAMP    ON   1330  1400        1
2 SENSOR  OFF              0002  1  R



Enter Command:

(U)p      (D)own      (S)et
(N)ew     (E)rase     (R)epeat
(C)lock   (T)ime      (A)ux
(K)eep    (O)n Time   (F)offtime
(L)oad    (G)o        (Q)uit
```

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New software house Piranha have snapped up the rights to Terry Pratchett's spoof fantasy novel, The Colour of Magic, and transformed it into an adventure.

There are thirty copies of the adventure waiting to be won in this simple to enter competition.

Discworld, a kingdom set on a turtle's back is populated by a very weird bunch indeed. There's Twoflower, Discworld's first tourist laden down with holiday money, Rincewind, a second rate wizard entrusted with protecting the naive tourist in his travels and of course there's Death, suffering from overwork but always up to mischief. Then there is the question of where the many legged luggage fits in to all this. The easy way to find out the answer to this mystery is to win the game itself.

Identity Parade

All you have to do to enter is look at the illustration opposite and identify the four characters aboard the flying luggage. They are Rincewind, Death, Twoflower and The Picture Imp. They are marked 1 to 4 in the black and white outline picture on this page. Simply put the numbers against the names on the entry coupon. Please remember to put the numbers and the names on the outside of your envelope.

The competition is open to all ZX readers except employees of Argus Specialist Publications, Piranha Software and Chase Web. Closing date for entries is January 7th 1987.

COLOUR OF MAGIC COMPETITION

Fill in the correct numbers:

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Rincewind is number ....

The Picture Imp is number ....

Twoflower is number ....

Name ....

Address ....

....

....

Send your entry to Colour of Magic Competition, ZX Computing Monthly, No 1 Golden Square, London, W1R 3AB.

128 Animation

Toni Baker shows how the 128's extra memory can be used for super smooth animation.

As I sit here at my TV screen I am looking at an amazing effect which I would not have thought possible only a few months ago. A multi-faceted spiked shape is rotating before my eyes, taking about five seconds for each revolution. The shape — which can only be adequately described as a first-stellated dodecahedron — is drawn as a framework, so that I can see the back of the shape as well as the front. It's rather incredible — but beautiful.

But, what is most astonishing of all is that the effect is being produced by none other than the ZX Spectrum! The secret lies in the vast untapped resources of memory on the Spectrum 128, making it possible to store whole screens, and recall them in sequence. Full screen high resolution animation is at last possible.

Even more astonishing is the knowledge that the BASIC program which drew the individual frames was knocked up in only a few hours. The skeletal appearance of the rotating figure is a consequence of the simplicity of the BASIC program. Had I spent a few days playing with an art studio program I could have achieved full colour shading with light glinting off each facet as it passes the screen — but that kind of modification I shall leave to you. There are many methods of drawing screen pictures, but the animation effect was produced by a little piece of machine code of my own.

Memory map

To understand how the program works it is necessary to know all about the organisation of the memory on the Spectrum 128. This is very simple, so I shall now explain it. Memory on the 128 is arranged in *PAGES*. There are eight such pages, numbered from zero to seven, and each page of memory contains 16K. Hence we have 16 * 8 = 128K of memory altogether. In addition there are two ROMs, but these aren't important as far as this program is concerned.

Addresses in paged memory begin at C000 and end at FFFF. Thus for each page of RAM the addresses overlap. Address CDEF on page zero is not the same thing as address CDEF on page one. They are different locations, despite having the same address. How then is it possible to access all of this memory if it's all superimposed on top of itself with the same address referring to any one of eight pages?

The answer is a technique called PAGING. Only one 16K page may be "paged in" at a time. "Paged in" means that a page may be accessed — it may be PEEKed or POKEd or used in the normal way. If a page is NOT paged in then it may not be accessed at all (with just two exceptions — which we'll come to later).

Because the addresses overlap, only one page may be paged in at a time. At all times, *one* of the pages will be paged in. When you use the computer normally, either in BASIC or machine code then page zero will be paged in, and it is important for any machine code program to restore page zero before returning to BASIC.

As traditional machine-codeists will know, memory on the Spectrum *appears* to start at 4000h and go continuously all the way up to FFFF, and then stop. Below 4000h is the ROM, or at least one of the ROMs! But appears is the operative word. Memory is organised in eight 16K pages as I've explained, and the appearance of a continuous stretch of RAM from 4000h to FFFF is a 48K illusion, and it's all brought about by hardware, not software.

Pages

The first chunk of memory runs from 4000h to 7FFF. This chunk is in fact RAM page five! The second chunk runs from 8000h to BFFF — this is RAM page two! The last chunk, which runs from C000 to FFFF is RAM page zero. In practice this means that if you page in RAM page five then addresses C000 to FFFF will access precisely the same memory locations as addresses 4000 to 7FFF. POKEing an address in the range C000 to FFFF will actually POKE the corresponding address in the range 4000 to 7FFF. In a similar fashion, if page two is paged in then PEEKing an address in the range C000 to FFFF will PEEK the corresponding address in the range 8000 to BFFF. Thus the appearance of continuity is maintained. For the machine code programmer it means that pages two and five are special. They appear to be fixed in memory, and have fixed addresses less than C000. Pages two and five are, in fact, always paged in, and this is an advantage.

Page five is special in another way too — a more familiar way. It stores the screen. POKEing an address in the range 4000 to 57FF (or an address in the range C000 to D7FF when page five is paged in) will directly POKE the screen. This you know, but the Spectrum 128 has not one but TWO memory mapped screens. Let us for a while explore this concept.

Screens

There are two screens, but only one of them may be visible on your TV at any one time. Normally this is screen zero. Screen zero is said to be ACTIVE whenever its contents appear on the TV, and similarly screen one is said to be ACTIVE whenever ITS contents appear on the TV. Screen one is stored in page seven, and this is a hardware manifestation, not a software one, so you cannot change the location of screen one. In this way page seven is special too. Locations C000 to D7FF store the screen bytes, while locations D800 to DAFF store the attributes, but remember these addresses refer to RAM page seven, not to RAM page zero, so it is not sufficient to POKE the addresses. Page seven must be paged in first.

As far as the screens are concerned, it doesn't make any difference which page is paged in. Screen zero or screen one may be active regardless of whichever page of RAM is paged in. Only one screen may be active at a time (fairly obviously), and it is impossible to deactivate both screens at once

```
10 CLEAR 26623
20 LOAD "animate" CODE
30 DIM X(12)
40 DIM Y(12)
50 LET X(1) = 128
60 LET Y(1) = 168
70 LET X(7) = 128
80 LET Y(7) = 8
90 FOR I = 0 TO 11
100 CLS
110 PRINT #0;"FRAME ";I
120 FOR J = 2 TO 6
130 LET ANGLE = PI * (72*J + 6*I) / 180
140 LET X(J) = 128 + 80 * COS ANGLE
150 LET Y(J) = 120 + 40 * SIN ANGLE
160 LET X(J+6) = 256 - X(J)
170 LET Y(J+6) = 176 - Y(J)
180 NEXT J
190 RESTORE
200 FOR J = 1 TO 15
210 READ A,B
220 PLOT X(A),Y(A)
230 DRAW X(B)-X(A),Y(B)-Y(A)
240 LET A = A + 6
250 IF A > 12 THEN LET A = A - 12
260 LET B = B + 6
270 IF B > 12 THEN LET B = B - 12
280 PLOT X(A),Y(A)
290 DRAW X(B)-X(A),Y(B)-Y(A)
300 NEXT J
310 INPUT ""
320 RANDOMIZE USR 45073
330 NEXT I
340 RANDOMIZE USR 45117
350 DATA 1,8,1,9,1,10,1,11,1,12
360 DATA 2,4,4,6,6,3,3,5,5,2
370 DATA 2,12,3,8,4,9,5,10,6,11
380 STOP
```

— so either one or the other will always be showing on the TV.

This means that it is possible to create flicker free animation! If you draw on screen one whilst screen zero is active then only screen zero will appear on the screen. Once the drawing is complete then you can activate screen one and the TV picture will change INSTANTLY!!! Now, with screen one active, you can draw on screen zero — only screen one (the previously completed drawing) will be showing on the TV. When this drawing is complete you can re-activate screen zero. Once again the TV image will change INSTANTLY with no flicker whatsoever. This, then, is the principle of my program.

When we write Spectrum 128 addresses down it is conventional to use a five digit hexadecimal number, rather than a four digit number. The first digit refers to the RAM page number. In this way I could uniquely refer to address BEAD on page four as address 4BEAD. This would be distinct from, say, 6BEAD, which refers to address BEAD on RAM page six. Whilst the machine code instruction set makes it impossible to refer to such locations directly (eg LD A,(4C000) is impossible) it is nonetheless a useful notation for we human beings. In this notation we could say that screen one occupies addresses 7C000 to 7DAFF inclusive (including the attribute bytes).

This notation has its disadvantages too. Because RAM page five is permanently mapped in at 4000 to 7FFF then we can describe the position of screen zero in one of two different ways — either as 4000 to 5AFF, or as 5C000 to 5DAFF. Both of these descriptions refer to the same chunk of memory.

For completeness, I should add that there are also two 16K ROMs, although, as has already been stated, the ROMs aren't really relevant to this program. The two ROMs each occupy addresses 0000 to 3FFF, so, as with the RAM pages, only one ROM may be paged in at a time. Using the same convention as for the RAM pages we can uniquely specify a ROM address as a five digit hexadecimal number, so that 01234 refers to address 1234 in ROM zero, whereas 11234 refers to address 1234 in ROM one. Surprisingly, the ROM which appears to be paged in normally (which you can PEEK either from BASIC or machine code) is actually ROM page ONE, not zero. This ROM is the same as the old 16K ROM which was present on 16K and 48K Spectrums, with just a couple of changes.

Enough of ROMs — let's get back to RAM pages and screens. Exactly HOW do you page them? The answer is the **OUT** instruction, and a new system variable called BANK_M. Its address is 5B5C (or 5DB5C to keep harping on about the same point over and over again). Figure one will explain exactly what each of its bits is for. In machine code it is possible to change RAM page, or to change which screen is active, by the simple procedure of loading BC with 7FFD, loading the A register with a value constructed from Figure one, and then performing two steps — in this order:

(i) Store the value from the A register in the system variable (BANK_M);
(ii) then use the machine code instruction **OUT (C),A.**

The order of the last two instructions is important. If you put these the wrong way round then the system will go wrong if an interrupt occurs between the two instructions — this way round it's quite safe. It is also possible to change ROM page by this method, but interrupts must be

```
                              ORG B000
00        FRAME_NO            DEFB 00
4F        PAGE_A              LD C,A              C:= required page/screen number.
3A5C5B                        LD A,(BANK_M)       A:= current page/screen number.
E6F0                          AND F0
B1                            OR C
01FD7F                        LD BC,7FFD          BC:= port no reqd to change page/scr.
325C5B                        LD (BANK_M),A       Store new page/screen.
ED79                          OUT (C),A           Actually change page/screen.
C9                            RET

                              ORG B011
1100C0    STORE_FRAME         LD DE,C000          DE:= address of even numbered frames.
3A00B0                        LD A,(FRAME_NO)     A:= frame number to store.
F5                            PUSH AF
CB3F                          SRL A               Divide by two.
3002                          JR NC,ST_FR_2
16D8                          LD D,D8             DE:= address of odd numbered frames.
FE05      ST_FR_2             CP 05
2001                          JR NZ,ST_FR_3
3C                            INC A               Note that page 5 must be skipped.
CD01B0    ST_FR_3             CALL B001,PAGE_A    Select RAM page A/Screen zero.
210040                        LD HL,4000          HL: points to screen zero.
010018                        LD BC,0018
EDB0                          LDIR                Store screen in memory.
AF                            XOR A               A:= 00.
CD01B0                        CALL B001,PAGE_A    Restore RAM page zero/Screen zero.
F1                            POP AF              A:= frame number.
3C                            INC A               A:= next frame number.
FE0C                          CP 0C
2001                          JR NZ,ST_FR_4       Jump unless all frames stored.
AF                            XOR A               In which case start again.
3200B0    ST_FR_4             LD (FRAME_NO),A     Store new frame number.
C9                            RET                 Return.
```

```
                      ORG B03D
3E07     ANIMATE      LD A,07
CD01B0                CALL B001,PAGE_A        Select RAM page 7/Screen zero.
210058                LD HL,5800              HL: points to attributes file.
1100D8                LD DE,D800              DE: points to screen 1 attributes.
010003                LD BC,0300
EDB0                  LDIR                    Copy attributes into screen one.
76       ANIM_LOOP    HALT                    Wait till next frame.
2100C0                LD HL,C000              HL:= address of even numbered frames.
3A00B0                LD A,(FRAME_NO)         A:= frame number to display.
F5                    PUSH AF
17                    RLA
17                    RLA
17                    RLA
E608                  AND 08
4F                    LD C,A                  C:= 00 (even frames) or 08 (odd
F1                    POP AF                  frames).
F5                    PUSH AF
CB3F                  SRL A                   A:= page number on which this frame
                                              is stored.
3002                  JR NC,ANIM_2
26D8                  LD H,D8                 HL:= address of odd numbered frames.
FE05     ANIM_2       CP 05
2001                  JR NZ,ANIM_3
3C                    INC A                   Note that page 5 must be skipped.
B1       ANIM_3       OR C                    Incorporate screen bit.
C5                    PUSH BC
CD01B0                CALL B001,PAGE_A        Select RAM page on which frame is
                                              stored, and either screen 0 (even
                                              frames) or screen 1 (odd frames).
110068                LD DE,6800
010018                LD BC,1800
EDB0                  LDIR                    Copy frame into buffer.
C1                    POP BC
79                    LD A,C                  A:= 00 (evens) or 08 (odds).
0F                    RRCA
0F                    RRCA
EE07                  XOR 07
B1                    OR C                    A:= 07 (evens) or 0D (odds).
CD01B0                CALL B001,PAGE_A        For even frames select screen 0
                                              and RAM page 7; for odd frames
                                              select screen 1 and RAM page 5.
```

disabled whilst the last two instructions are carried out in this case.

M/C

The program makes use of all of these techniques. The machine code program is extraordinarily simple, provided you understand the screen and paging system that I have just described. I have achieved animation by storing twelve complete screen images throughout the vast spread of memory available. The attribute bytes in this case are not saved since they are the same for each frame, but you could adapt the program to store the attribute bytes as well with no difficulty. I have stored two complete frames on RAM pages zero, one, two, three, four and six. I have not used page five because page five contains screen zero and the BASIC program, along with the system variables, the machine stack (following the BASIC CLEAR instruction) and so on. I have not used page seven because page seven contains screen one and a whole host of new system variables and stuff. Even numbered frames are stored at address C000 on the relevant page, while odd numbered frames are stored at address D800 on the same page.

Unfortunately it isn't possible to use the machine code **LDIR** instruction to transfer bytes from one page of memory to another if both pages have the same addresses. For instance — suppose there were a frame stored at address 4C000, and I wished to transfer it to address 7C000. The LDIR instruction is not possible. It is possible to load one byte at a time, provided you change pages between the fetch and the store, and then back again afterwards, but this takes a phenomenally long time in machine code terms. To get round the problem I have made use of a temporary buffer at address 6800 (that is 5E800). The above example would be solved by paging in page four, using **LDIR** to transfer the frame from 4C000 down to 6800, and then paging in page seven and using **LDIR** once more — this time to transfer from the buffer at 6800 up to 7C000.

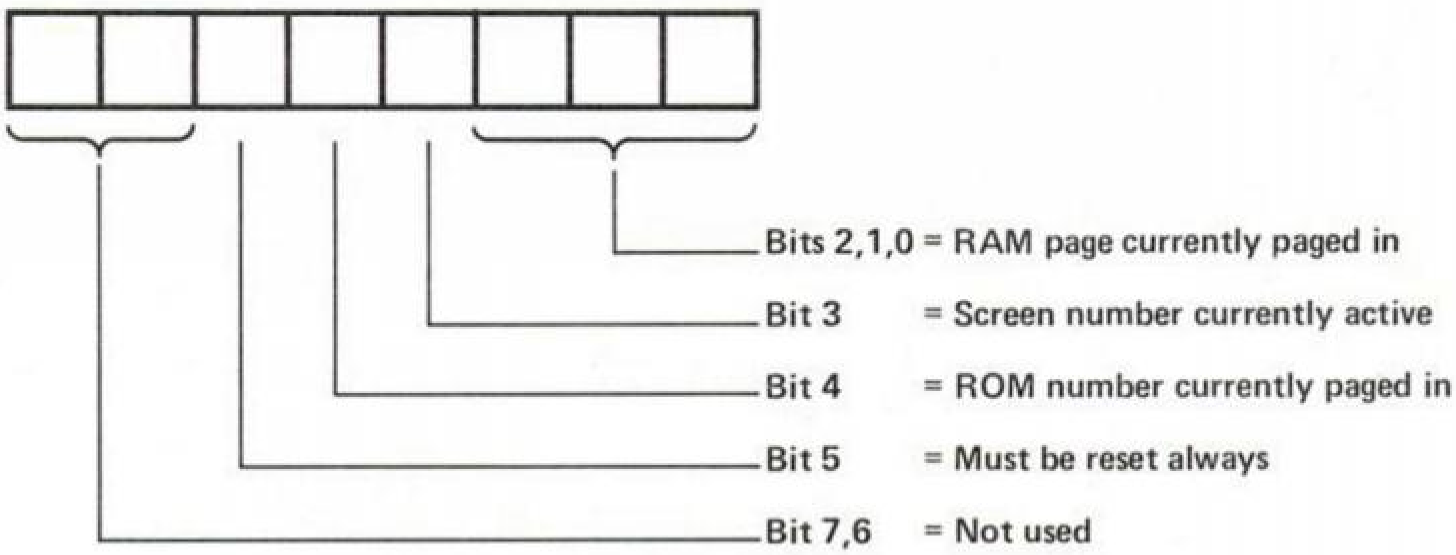
The machine code is in three parts. It is stored at address B000, which corresponds to address 2F000. Note that although page two is in fact used to store screens, these screens occupy locations 2C000 to 2EFFF only. Locations above this are free for machine code and will not be overwritten by the various frames.

Page A

The first part of the code is called PAGE_A (address B001). It pages in the required RAM page and activates the required screen, as specified by the A register, but without changing the current ROM. This is quite boringly simple. The second piece of code is STORE_FRAME (address B011) and is called from BASIC to transfer the image currently on the screen (screen zero that is — the normal screen used by BASIC) into its specific place in memory. The last piece of code is called ANIMATE

```
210068                LD HL,6800              HL: points to copy of frame to
                                              display.
1100C0                LD DE,C000              DE:= address of screen (Note that
                                              address C000 on RAM page 5 is the
                                              same as address 4000 normally).
010018                LD BC,
EDB0                  LDIR                    Copy the frame into the screen
                                              not being displayed.
F1                    POP AF                  A:= frame number.
3C                    INC A                   A:= next frame number.
FE0C                  CP 0C
2001                  JR NZ,ANIM_4            Jump unless all frames displayed.
AF                    XOR A                   In which case start again.
3200B0   ANIM_4       LD (FRAME_NO),A         Store new frame number.
CD541F                CALL 1F54,BREAK_KEY     Is BREAK key pressed?
38B4                  JR C,ANIM_LOOP          Loop back to display next frame
                                              unless BREAK pressed.
AF                    XOR A
CD01B0                CALL B001,PAGE_A        Restore RAM page 0/Screen 0.
CF0C                  RST 08/DEFB 0C          Generate error report
                                              "D BREAK - CONT repeats".
```

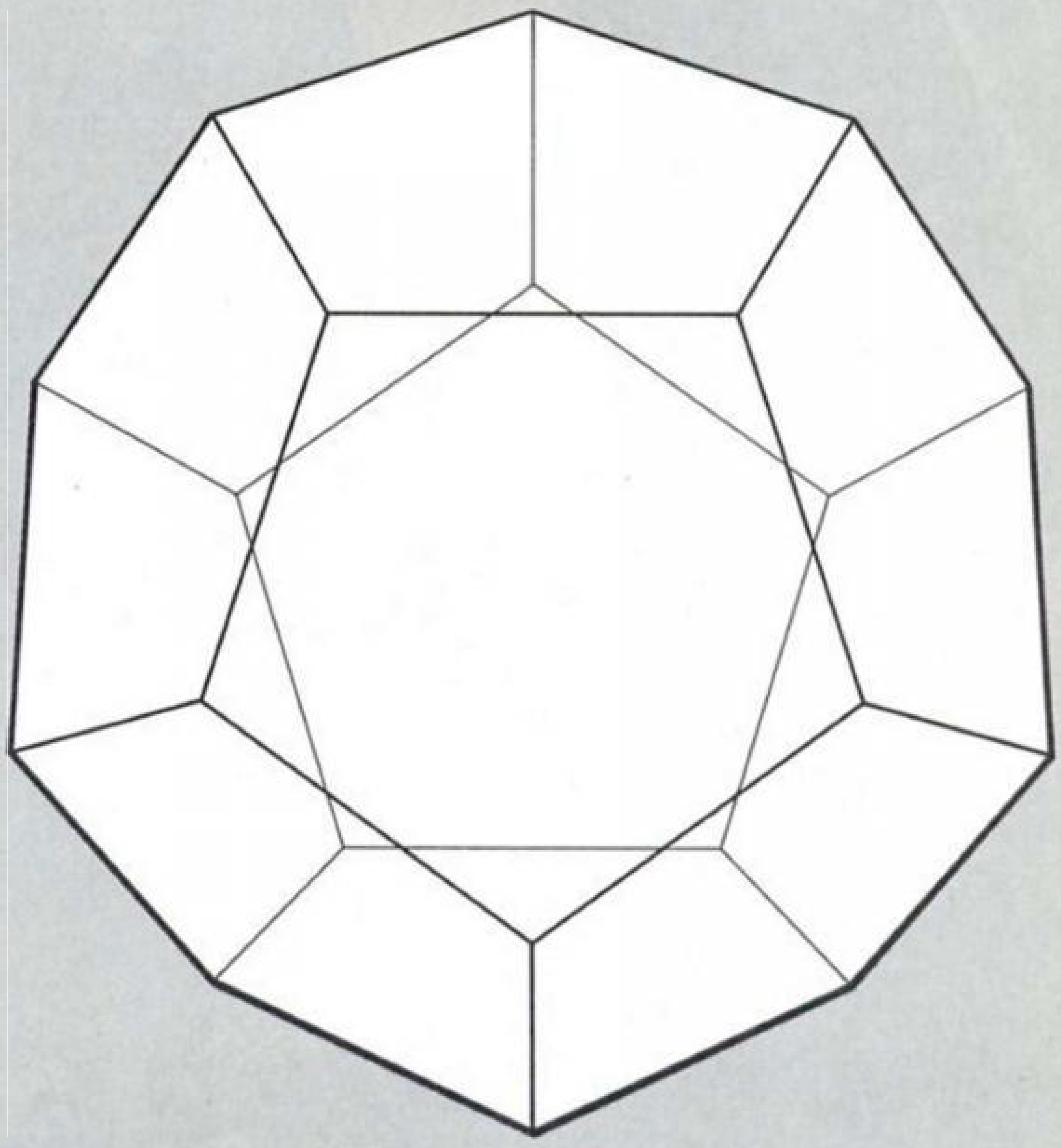
Figure 1. The meaning of the bits of the system variable BANK_M at address 5B5C. When output to port 7FFD will change pages as follows:



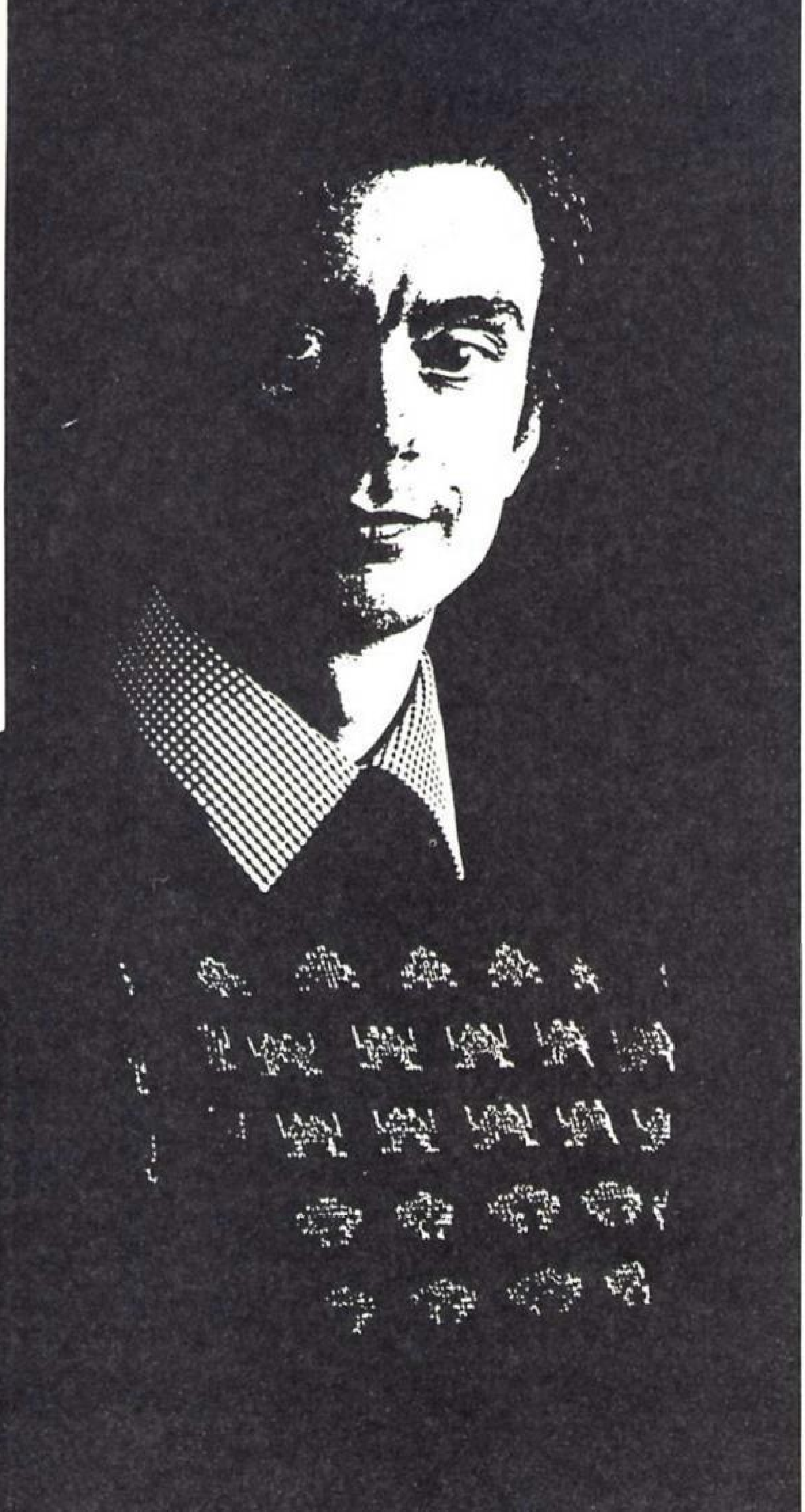
(address B03D) and it is this program which animates the twelve stored frames at a rate of twelve frames per second. This rate is completely flicker free and gives one second of continuous full screen free flowing movement. If the twelve frames are designed to repeat in a cycle, as in my example, then you have a cycle of continuous movement which goes on forever. Fortunately my program does allow you to break out by pressing BREAK.

The BASIC which I have included is an example of how to use the ANIMATE routine. The outer FOR/NEXT loop, **FOR I = 0 to 11,** will draw a quite pretty geometric figure from twelve different angles. Line 320 will call the machine code STORE_FRAME routine which will store each picture in memory once it is drawn. Finally, line 340 will call the ANIMATE routine to set the picture moving. You can adapt, or even change the BASIC program altogether if you like. The most impressive thing you could do would be to create twelve full screen pictures using an art studio type program, and save these on tape once they are drawn. Then you can rewrite my BASIC program to simply load screen images from tape and store them in memory one at a time as they are loaded.

This program is quite interesting from a machine code point of view, and quite impressive from a visual point of view. It is my offering for the Winter Solstice — a present to you all (or at least those of you who've got a Spectrum 128 — the Plus Two's out now and you never know — you might get one as a present this season). Happy Solstice everyone.



THE PROFESSIONAL TOUCH



Hewson's Steve Turner with advice on getting your mega-game published, plus a machine code sound routine.

There are two ways you can get your game on the market, you can either do the whole business of duplication and marketing yourself or find someone else to do all or part of it for you.

In the early days of home computing most games were sold by mail order and do-it-yourself marketing was easy. All that was required was a small ad in one of the few computer magazines, but the market has changed considerably since then and now every product must compete against dozens of others. The major stores account for a huge proportion of sales of a game, and success or failure is affected by the acceptance of a game by the buyers for a few major distributors. They consider media coverage (the amount you spend on ads), reliability of the supplier as well as the quality of the game.

To succeed, a professional approach to advertising, packaging and publicity is needed. This all takes a great deal of time and money. A budget of £20,000 would not be excessive to cover advertising, a press launch, artwork and publicity. On top of that you need the initial duplication and print costs.

Clearly if you want to succeed you must have a wide range of skills or have the ability to set up and run a team. So unless you are a business tycoon in the making I advise you to spend your time writing programs and leave the marketing to the experts.

Licensing your program

Finding someone to market the program for you is a way of splitting the risk of the time and money invested in a game. The publisher's investment is usually many times that of the writer, so, in a royalty agreement, the publisher takes the lion's share. Royalty agreements differ widely but a typical split will be 15% of the wholesale price for the programmer. Wholesale prices may be only 40% of the shelf price so this works out at 50p to 90p for each copy sold.

To find a publisher it is best to really polish up your game first. Publishers receive hundreds of games a year and can only afford the time to give most a short look. A demo mode or

Listing 1

```
SOUND ROUTINE BASIC TESTBED

LINE 20 LOADS THE MACHINE CODE FROM TAPE



  10 CLEAR 40000
  15 LET SONTAB=45235: LET SONREQ=45234
  20 LOAD "SOUND"CODE 45000
  30 DIM A(10)
  40 FOR X=1 TO 9: LET A(X)=0: NEXT X
1000 CLS : PRINT "        SOUND TESTBED"
1010 PRINT '"1.SOUND NUMBER",A(1)
1020 PRINT "2.START FREQ",A(2)
1030 PRINT "3.FREQ CHANGE",A(3)
1040 PRINT "4.CHANGE TIMES",A(4)
1050 PRINT "5.REPEAT TIMES",A(5)
1060 PRINT "6.MODULATE TYPE",A(6)
1070 PRINT "     0=SAWTOOTH"'"     1=2ND MOD DOWN"'"     2=2ND MOD UP"'"     OTHER=T
RIANGLE"
1080 PRINT "7.RESET FREQ",A(7)
1090 PRINT "8.CHNGE T RESET",A(8)
1100 PRINT "9.CHAIN TO NO",A(9)
1110 PRINT "10.DELAY ",A(10)
2000 INPUT "ENTER 0 TO FIRE SOUND OR NUMBER TO CHANGE VALUES";I
2010 IF I=0 THEN  GO TO 3000
2020 IF I>10 OR I<1 THEN  GO TO 2000
2030 LET X=INT I
2040 INPUT "NEW VALUE 0-255 ";I
2050 IF I<0 OR I>255 THEN  GO TO 2040
2060 LET A(X)=INT I
2063 IF X=1 THEN  GO TO 2500
2065 REM STORE SOUND IN TABLE
2070 LET O=SONTAB+(A(1)*8)+X-2
2080 POKE O,A(X)
2090 GO TO 1000
2500 REM GET SOUND
2510 LET O=SONTAB+(A(1)*8)
2520 FOR X=2 TO 9: LET A(X)=PEEK O: LET O=O+1:: NEXT X
2530 GO TO 1000
3000 REM CALL SOUND
3005 LET X=A(10)
3010 PRINT AT 20,1;"PRESS 0 TO REPEAT SOUND OR 1 TO CHANGE."
3020 POKE SONREQ,A(1)+1
3025 PAUSE 20
3030 RANDOMIZE USR 45000: FOR Y=0 TO X: NEXT Y: IF INKEY$="" THEN  GO TO 3030
3060 IF INKEY$="0" THEN  GO TO 3020
3070 GO TO 1000
9000 FOR X=45227 TO 45400: PRINT PEEK X,: NEXT X
```

Listing 2

```
0000           00010  ;SONV02   SOUND TESTBED
0000           00020         ORG  0AFC8H
AFC8           00000  SOUND
AFC8 F3        00000         DI
AFC9 3AB2B0    00000         LD   A,(SONREQ)
AFCC A7        00000         AND  A
AFCD 281F      00000         JR   Z,NONEW
AFCF 32B1B0    00000         LD   (SONNOW),A ;TRIGGER
AFD2 FE0A      00000         CP   0AH        ;SOUND
AFD4 2825      00000         JR   Z,NOISE
AFD6 21B3B0    00000         LD   HL,SONTAB
AFD9 3D        00000         DEC  A          ;ADDRESS
AFDA 87        00000         ADD  A,A        ;SOUND
AFDB 87        00000         ADD  A,A        ;TABLE
AFDC 87        00000         ADD  A,A
AFDD 5F        00000         LD   E,A
AFDE AF        00000         XOR  A
AFDF 32B2B0    00000         LD   (SONREQ),A
AFE2 57        00000         LD   D,A
AFE3 19        00000         ADD  HL,DE
AFE4 010800    00000         LD   BC,8
AFE7 11A9B0    00000         LD   DE,SONFRQ
AFEA EDB0      00000         LDIR
AFEC 1832      00000         JR   PROCES
AFEE 3AB1B0    00000  NONEW  LD   A,(SONNOW)
AFF1 A7        00000         AND  A
AFF2 CA8EB0    00000         JP   Z,SONEX
AFF5 FE0A      00000         CP   0AH
AFF7 2027      00000         JR   NZ,PROCES
AFF9 1809      00000         JR   CNOIS
AFFB 3E0A      00000  NOISE  LD   A,0AH      ;SOUND 0AH
```

```
AFFD 32ACB0    00000         LD   (SONLEN),A ;IS NOISE
B000 AF        00000         XOR  A
B001 32B2B0    00000         LD   (SONREQ),A
B004 0630      00000 CNOIS   LD   B,30H
B006 CD90B0    00000 GAIN    CALL RANDOM
B009 E610      00000         AND  10H
B00B D3FE      00000         OUT  (0FEH),A
B00D 0E02      00000         LD   C,02H
B00F 0D        00000 MAKE    DEC  C
B010 20FD      00000         JR   NZ,MAKE
B012 10F2      00000         DJNZ GAIN
B014 21ACB0    00000         LD   HL,SONLEN
B017 35        00000         DEC  (HL)
B018 2074      00000         JR   NZ,SONEX
B01A AF        00000         XOR  A
B01B 32B1B0    00000         LD   (SONNOW),A
B01E 186E      00000         JR   SONEX
B020           00000 PROCES
B020 3AA9B0    00000         LD   A,(SONFRQ)
B023 67        00000         LD   H,A
B024 3E10      00000         LD   A,10H
B026 16FF      00000         LD   D,0FFH
B028 5C        00000 SONLP   LD   E,H      ;TOGGLE PORT
B029 D3FE      00000         OUT  (0FEH),A
B02B EE10      00000         XOR  10H
B02D 15        00000 FREQ    DEC  D
B02E 2805      00000         JR   Z,MOD
B030 1D        00000         DEC  E
B031 20FA      00000         JR   NZ,FREQ
B033 18F3      00000         JR   SONLP
B035 3AAAB0    00000 MOD     LD   A,(SONCFQ)
B038 84        00000         ADD  H
B039 32A9B0    00000         LD   (SONFRQ),A
B03C 21ABB0    00000         LD   HL,SONMOD
B03F 35        00000         DEC  (HL)
B040 C28EB0    00000         JP   NZ,SONEX
B043 21ACB0    00000         LD   HL,SONLEN
B046 35        00000         DEC  (HL)
B047 2011      00000         JR   NZ,MODIFY
B049 AF        00000         XOR  A
B04A 32B1B0    00000         LD   (SONNOW),A
B04D 3AB0B0    00000         LD   A,(SONNEX)
B050 A7        00000         AND  A
B051 CA8EB0    00000         JP   Z,SONEX     ;CHAIN
B054 32B2B0    00000         LD   (SONREQ),A ;NEXT
B057 C38EB0    00000         JP   SONEX
B05A 3AAEB0    00000 MODIFY  LD   A,(SONRSF)
B05D 4F        00000         LD   C,A
B05E 3AADB0    00000         LD   A,(SONTYP)
B061 A7        00000         AND  A
B062 2820      00000         JR   Z,RESET ;=TRIANGLE
B064 3D        00000         DEC  A
B065 2815      00000         JR   Z,TYP1
B067 3D        00000         DEC  A
B068 280A      00000         JR   Z,TYP2
B06A 3AAAB0    00000 TYPOTH  LD   A,(SONCFQ);SAWTOOTH
B06D ED44      00000         NEG
B06F 32AAB0    00000         LD   (SONCFQ),A
B072 1814      00000         JR   MODE
B074 0C        00000 TYP2    INC  C        ;2NDRY MOD
B075 0C        00000         INC  C
B076 79        00000         LD   A,C
B077 32AEB0    00000         LD   (SONRSF),A
B07A 1808      00000         JR   RESET
B07C 0D        00000 TYP1    DEC  C        ;2NDRY MOD
B07D 0D        00000         DEC  C
B07E 79        00000         LD   A,C
B07F 32AEB0    00000         LD   (SONRSF),A
B082 1800      00000         JR   RESET
B084 79        00000 RESET   LD   A,C
B085 32A9B0    00000         LD   (SONFRQ),A
B088 3AAFB0    00000 MODE    LD   A,(SONRMD)
B08B 32ABB0    00000         LD   (SONMOD),A
B08E           00000 SONEX
B08E FB        00000         EI
B08F C9        00000         RET
B090 22A5B0    00000 RANDOM  LD   (RNHLST),HL
B093 2AA7B0    00000         LD   HL,(RNSEED)
B096 23        00000         INC  HL
B097 7C        00000         LD   A,H
B098 E603      00000         AND  3
B09A 67        00000         LD   H,A
B09B 32A7B0    00000 ROK     LD   (RNSEED),A
B09E ED5F      00000         LD   A,R
B0A0 AE        00000         XOR  (HL)
B0A1 2AA5B0    00000         LD   HL,(RNHLST)
B0A4 C9        00000         RET

B0A5 0000      00000 RNHLST  DW   0
B0A7 0010      00000 RNSEED  DW   1000H
B0A9 00        00000 SONFRQ  DB   0     ;FREQ
B0AA 00        00000 SONCFQ  DB   0     ;CHANGE FREQ
B0AB 00        00000 SONMOD  DB   0     ;MODUL CT
B0AC 00        00000 SONLEN  DB   0     ;LEN
B0AD 00        00000 SONTYP  DB   0     ;TYPE
B0AE 00        00000 SONRSF  DB   0     ;RESET FREQ
B0AF 00        00000 SONRMD  DB   0     ;RESET MODULATR
B0B0 00        00000 SONNEX  DB   0     ;NEXT SOUND
B0B1 00        00000 SONNOW  DB   0     ;PRESENT SOUND
B0B2 00        00000 SONREQ  DB   0     ;TRIGGER SOUND
B0B3           00000 SONTAB  DS   256
B1B3           0580          END

00000 TOTAL ERRORS
```

special key to flip to every screen is a good idea. The game instructions should be short and to the point, don't write pages describing the game, just include a list of its special features as you would if you were advertising the game. Remember, in effect you are trying to sell the game and show how organised you are.

To decide which publishers to approach, look at the quality of their advertisments. See how many mentions they get in the magazines and how well their programs do on average in the charts. Try to get more than one offer for your program so you can compare them.

Money Matters

If you are successful and you start to receive your royalties there are several things to get sorted out. You will usually get paid without income tax being deducted. This means you will have to keep a record of your payments and declare them to the local income tax office. If you have no other job you just write and say you are now self employed. You have to buy a monthly national insurance stamp so at the same time write to the DHSS office. Don't forget all the current self employment incentives if you are unemployed. Contact a job centre and you could receive financial help.

If you have another job you will still have to declare your earnings to the inland revenue who will assess any additional DHSS liability at the same time.

You can deduct expenses for paper, travel, equipment depreciation, postage, etc, from your earnings so it is important to keep simple accounts. Keep receipts for anything you buy. It is simpler to set up a separate bank account for the business so that all the business transactions are separate from your personal finances. You just pay yourself from this account once a month.

When I first started working as a programmer I soon found that I needed an accountant to prepare my yearly return to the inland revenue. This certainly reduced the tax I had to pay by including expenses I would have overlooked.

If you receive more royalties than the current VAT threshold you must be registered for VAT.

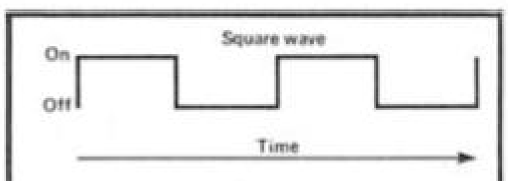


Figure 1.

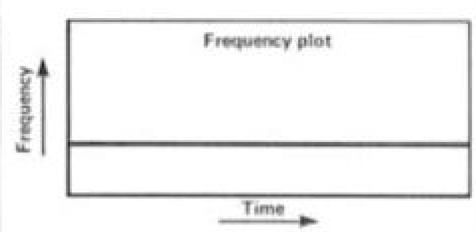


Figure 2.

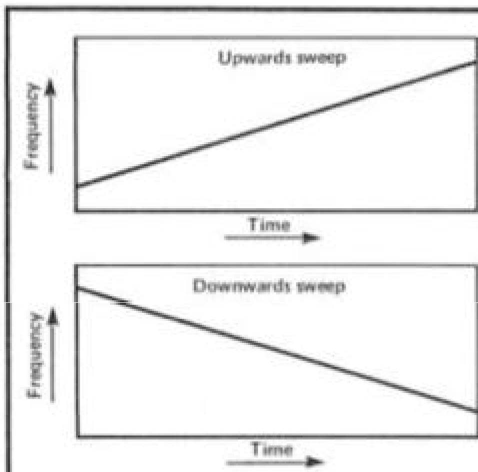


Figure 3.

Then your publisher has to add VAT to your royalties and you have to send them an invoice for each royalty cheque. You will also have to keep certain accounts. To find out more contact your local VAT office. Their latest leaflets are quite readable and very helpful.

Sound Routine

This month's program is a sound routine that I used in my last game, Quazatron. I always add the sound when I have almost finished a program. This is because I run it under interrupt mode 2. The version that follows does not include the interrupt processing for the sake of simplicity.

The 48K Spectrum has a very limited sound capability. It has one channel that can be either on or off. This month's modulator routine produces complex sounds by changing the frequency. This principle of frequency modulation can be adapted to drive dedicated sound chips, so 128 owners should also read on. I used the same technique to drive the sound chip in the C64 URIDIUM. Yamaha DX synthesisers use a similar technique with up to four stages of modulation.

The routine applies linear modulation to the frequency in two stages. All this means is that the frequency is changed up or down according to values held in a data table. Figure 1 shows a plot of a constant beep such as BASIC can produce. It is essentially a square wave where the peaks are the same size as the troughs. Figure 2 shows the same beep as a plot of frequency against time.

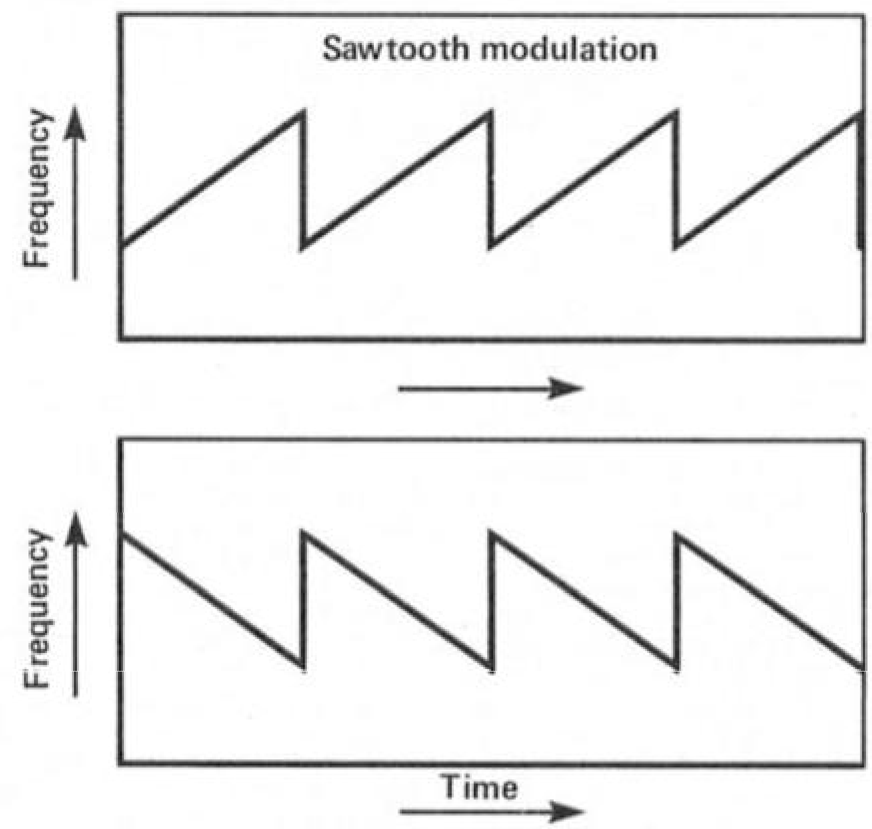


Figure 4.

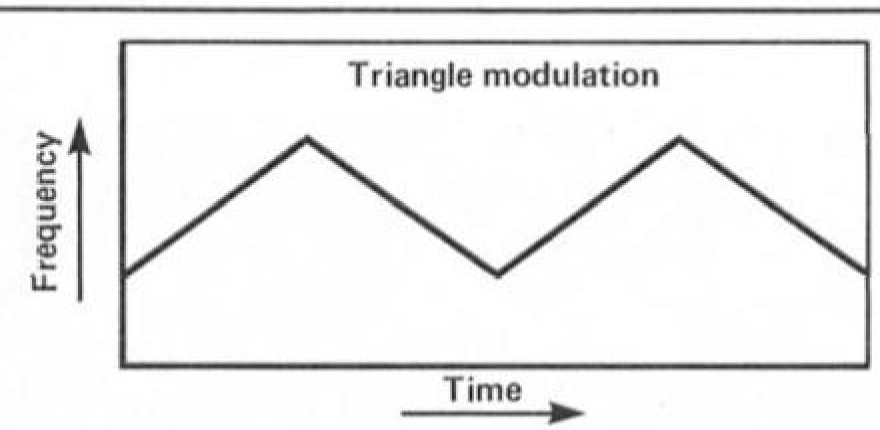


Figure 5.

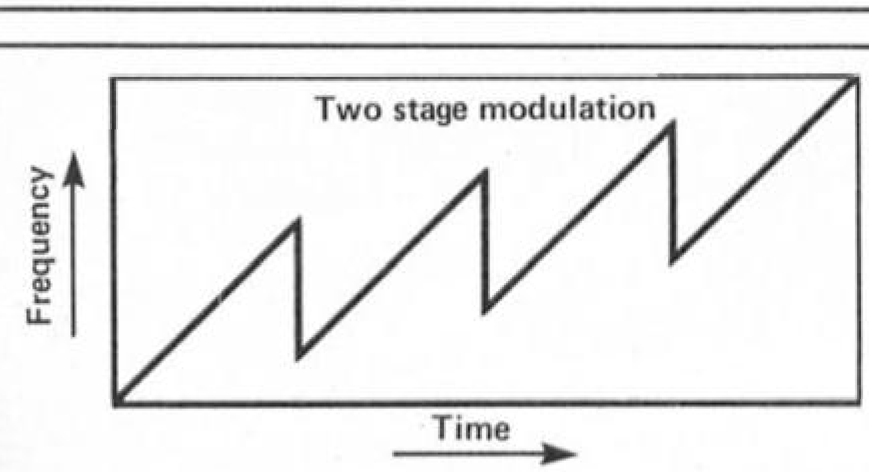


Figure 6.

First stage modulation

We can make the sound more interesting by changing the frequency either up or down, or both. My routine only does this in a linear fashion. This means that the rate of change is constant. If you want to imporve the routine try applying formulae to the rate or frequency change. Figure 3 shows the two plots for a sweep up and a sweep down.

Sawtooth Modulation
This is easily produced by including a timing count. Every time this counts down to zero the frequency is reset to its start value. Another counter specifies how many times the routine must repeat the cycle of modulation. Figure 4 shows frequency plots of the two sawtooth patterns that can be produced.

Triangle Modulation.
The routine can do this by simply negating the frequency change instead of resetting the frequency at the end of a modulation cycle. Figure 5 shows a frequency plot for this.

Second Stage Modulation

This is very limited in the routine, but there is no reason why this function could not be extended. Every time the frequency is reset the reset value can be changed. Figure 6 demonstrates this effect.

More complex sounds can be achieved by chaining several sounds together. When a sound has been completed the routine will initiate another sound if the chaining field is used in the sound table.

To create new sounds all you have to do is play with the values in the sound table, fire the sound and listen to the result. You will soon get the feel of the range of effects that can be produced.

THE DISCOVERY COLUMN



More advice for owners of the Discovery disc, from John Wase.

A few more utilities for Discovery owners again this month. The first, from George Brewster of Crook, Co. Durham, lets you keep an up-to-date index of all the files on your discs, enabling one to locate easily that "lost" file by means of a search routine. The second, by Robert Kinglsey of Hod Hasharon, Israel, could also be used in conjunction with this, for it allows you to print a "neat" index of the CAT file across the page. Finally there's one from me to add or remove files from an ordinary sequential file list such as Opus' example, the infamous 'Tell'.

Index and Search

This one is virtually self-explanatory. A listing of the BASIC part of the program is shown in figure 1. When the program is first set up, a character array sufficient to hold all the filenames on all the discs is dimensioned (lines 10 to 30), in this case 50 filenames on 25 discs (readers with non-standard — e.g. DSDD discs — might well have to alter the variable *f* in line 10 if this is too few). Next, a machine-code routine is POKEd into the appropriate addresses. The catalogue of each disc in turn is then read into the appropriate part of the character array, overwriting any entries already existing. Finally, the machine-code routine (there is an assembly listing in figure 2) finds all the filenames matching the searchkey entered. For this system to work, the disc names must start with   followed by two digits or one digit and a space: provided that you have a spare disc or two, it is very easy to rename discs not conforming to this system. Filenames themselves should not start with a digit because this is read at line 1150 as the end-of-catalogue marker. This routine will also run on microdrives if the OUT in line 1050 and the IN in line 1080 are omitted.

Neat Catalogue

Users of non-standard large capacity discs, and also those who keep a large number of small files will find this routine particularly useful. It was designed to print the catalogue right across the printer width, thus avoiding using yards of paper; it also prints to the screen in two columns, so doubling its capacity and preventing information which is still needed being scrolled away.

A listing is given in figure 3. The drive number is first of all input into the program, which then POKEs a small machine-code subroutine into the appropriate addresses, starting

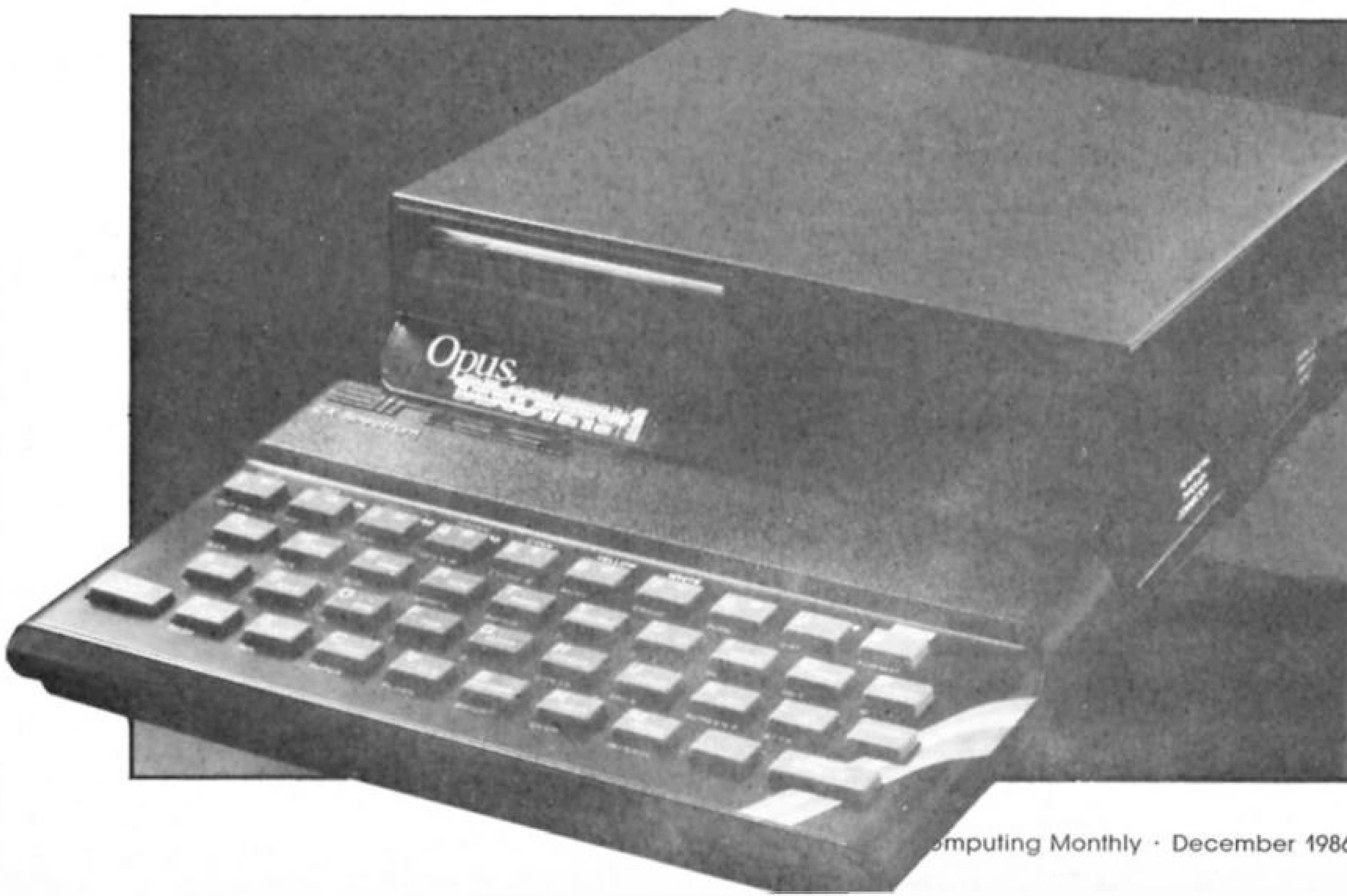


Figure 1: Index program listing

```
   5>REM directory B
   8
   9 REM ** Initiate
  10 LET f=50:                REM max 50 files per disk
  20 DIM d$(f*25+1,10):       REM Array d$ holds the directory
- in this case sufficient for 25 disks with up to 50 files on
each
  30 LET d$(f*25+1)=CHR$ 255:   REM End-of-directory marker
  40 RESTORE
  50 FOR r=65379 TO 65465
  60 READ d: POKE r,d:        REM Load machine code search
routine
  70 NEXT r
  80 DATA 221,33,91,255,42,75,92,205,184,25,235,126,254,75,32
  90 DATA 247,1,3,0,9,34,95,255,237,91,95,255,42,93,255,1,10,0,9
 100 DATA 34,93,255,221,52,0,32,3,221,52,1,26,254,255,40,32,203
 110 DATA 239,79,126,254,255,40,24,254
 120 DATA 35,32,11,35,17,97,255,1,2,0,237,176,24,206,203,239,185
 130 DATA 19,35,40,221,24,197,237,75,91,255,201
 198
 199 REM ** Options
 200 CLS : PRINT AT 12,0;"OPTIONS"''''
 210 PRINT "1  Enter data into directory"'
 220 PRINT "2  Search directory"'
 230 PRINT "3  SAVE directory"''
 240 LET k$=INKEY$: IF k$="" THEN GO TO 240
 250 IF k$<"1" OR k$>"3" THEN GO TO 240
 260 CLS : GO TO VAL k$*1000
 998
 999 REM ** Enter data
1000 PRINT #1;"ENTER DATA INTO DIRECTORY"'''"O = OPTIONS
  R = Ready"'"Insert disk into drive 1"
1010 LET k$=INKEY$: IF k$="" THEN GO TO 1010
1020 IF k$="o" THEN GO TO 200
1030 RANDOMIZE USR 3438:         REM Clear lower screen
1040 PRINT #1;"Reading catalogue - Please wait"
1050 OPEN #4;"m";1;"directoryD" OUT : REM Open file for writing
1060 CAT #4;1: REM Copy the catalogue into a temporary file
1070 CLOSE #4
1080 OPEN #4;"m";1;"directoryD"IN : REM Open file for reading
1090 LET r=1: REM Record number 1
1100 INPUT #4;f$:                REM Read a record from the file
into f$
1110 IF f$(1)="#" THEN LET d=VAL f$(2 TO 3): REM If the first
character of f$ is "#" characters 2 and 3 are the disk number
1120 LET d$((d-1)*f+r)=f$:       REM Copy f$ into the appropriate
element of the main array
1130 PRINT (d-1)*f+r;TAB 8;f$:  REM Print it on screen to show
progress
1140 LET r=r+1: REM Count up the record numbers
1150 IF f$(1)<"0" OR f$(1)>"9" THEN GO TO 1100:  REM If f$ does
not start with a digit continue
1160 CLOSE #4: ERASE "m";1;"directoryD":   REM If f$ does start
with a digit it is the number of freekilobytes left on the disk:
there are no more filenames so  finish
1170 IF r<f THEN LET d$((d-1)*f+r)="": LET r=r+1: GO TO 1180:
REM Clear the remainder of current disk's section of the
directory
1180 GO TO 1000
1998
1999 REM ** Search directory
2000 PRINT #1;"SEARCH DIRECTORY"'''"S = Search          O = Opti
ons"
2010 LET k$=INKEY$: IF k$="" THEN GO TO 2010
2020 IF k$="o" THEN GO TO 200
2030 INPUT "ENTER searchkey ";k$
2040 IF LEN k$>10 THEN PRINT AT 21,0;"Maximum length = 10 charac
ters": GO TO 2030
2050 PRINT PAPER 1; INK 7;"Searchkey = """;k$;""""
2060 LET k$=k$+CHR$ 255:         REM Add end marker to searchkey
2070 LET c=0
2080 POKE 65371,0: POKE 65372,0: REM Reset element number
2090 LET a=PEEK 23627+256*PEEK 23628+4: REM  Ten bytes before
start of directory at d$(1,1):  NOTE d$() is the second variable
in the variables area
2100 POKE 65373,a-(INT (a/256)*256): POKE 65374,INT (a/256):
REM Variable A is the address at which the search will begin
2110 LET e=USR 65379: REM Start of machine code.  Returns
element number if searchkey is matched
2130 IF e<(f*25+1) THEN PRINT "Disk ";CHR$ PEEK 65377;CHR$ PEEK
65378;TAB 9;d$(e): LET c=1: GO TO 2110
2140 IF NOT c THEN PRINT """";k$( TO LEN k$-1);"""";" not matche
d"
2150 GO TO 2000
2998
2999 REM ** SAVE directory
3000 PRINT #1;"   Insert disk into drive 1"'"   Press any key wh
en ready"
3010 IF INKEY$<>"" THEN GO TO 3010
3020 IF INKEY$="" THEN GO TO 3020
3030 SAVE *"m";1;"directory" LINE 40: VERIFY *"m";1;"directory"
3040 GO TO 200
```

at line 8000. The printer or screen are selected in lines 2005 to 2015: do make sure that the printer control codes match your own printer. Finally (lines 2070, 2100) the filenames and free space are printed out. A sample printout is given in figure 4, and a screen dump in figure 5: note the difference. Again, this routine will work both with discs and with microdrives; for microdrives, simply amend line 2020 to "cartridge name".

Alterfile

The Discovery manual on p 20 (the bit on random access files) comments on the famous "telephone" files as follows: "In these programmes, the information is saved and retrieved one item after another. If you want to locate the third name and telephone number in the file you must first read and discard the first two names and telephone numbers. Altering the information is even more difficult." Random access files all have to be set up to the same lengths, unlike sequential files, and this can be very wasteful of space. Under these circumstances sequential files can be preferred, particularly with only 178K to spare. Here is a rather tortuous program which does just what the book says: it reads each item in turn, discards it if necessary, inserts a new record if necessary, and finally saves each record in turn on a second disc in drive 2. The listing is given in figure 6. It's fairly self explanatory, the only comment I would make is that single disc owners will have to set up a ram disc instead, save the file on this, and then save it subsequently to a floppy in drive 1.

I have had some trouble with my new Sinclair/Amstrad+2 and Romantic Robot's multiface, which won't even work with the Opus 2.2 ROM when the 128 is in 48K mode — gives a disc I/O error each time you try and save anything. Romantic Robot tell me that they have a new 128K model which will be on the

Figure 2: Assembly listing for machine code section of Index program

```
              0000 "directory I"
FF5B          0010      ORG  0FF5BH
FF5B 0000     0020 ELNO DEFW 0            ; Current element number in D$
FF5D 0000     0030 ELAD DEFW 0            ; Address of current element
FF5F 0000     0040 SKAD DEFW 0            ; Address of start of searchkey (K$)
              0045 ;
FF61 0000     0050 DKNO DEFS 2            ; Current disk number
FF63 DD215BFF 0060 STRT LD   IX,ELNO
              0064 ;
              0065 "FIND ADDRESS OF K$"
FF67 2A4B5C   0070      LD   HL,(5C4BH)
FF6A CDB819   0080      CALL 19B8H
FF6D EB       0090      EX   DE,HL
FF6E 7E       0100      LD   A,(HL)
FF6F FE4B     0110      CP   "K"
FF71 20F7     0120      JR   NZ,0F7H
FF73 010300   0130      LD   BC,0003
FF76 09       0140      ADD  HL,BC
FF77 225FFF   0150      LD   (SKAD),HL    ; Store address of start of K$ text
              0154 ;
              0155 "COMPARE SEARCHKEY WITH"
              0156 "FILENAMES IN DIRECTORY"
FF7A ED5B5FFF 0160 LOP1 LD   DE,(SKAD)
FF7E 2A5DFF   0170      LD   HL,(ELAD)
FF81 010A00   0180      LD   BC,000AH
FF84 09       0190      ADD  HL,BC
FF85 225DFF   0200      LD   (ELAD),HL    ; Point to start of next element
FF88 DD3400   0210      INC  (IX+00)      ; Count up LSB of element number
FF8B 2003     0220      JR   NZ,3
FF8D DD3401   0230      INC  (IX+01)      ; If LSB reaches zero add one to MSB
              0235 ;
FF90 1A       0240 LOP2 LD   A,(DE)       ; Get character from searchkey
FF91 FEFF     0250      CP   FF
FF93 2820     0260      JR   Z,OUT        ; Finish if end of searchkey
FF95 CBEF     0270      SET  5,A          ; Convert to lower case
FF97 4F       0280      LD   C,A          ; Save character from searchkey
FF98 7E       0290      LD   A,(HL)       ; Get character from directory
FF99 FEFF     0300      CP   FF
FF9B 2818     0310      JR   Z,OUT        ; Finish if end of directory
FF9D FE23     0320      CP   "#"
FF9F 2008     0330      JR   NZ,NEXT      ; If not disk number jump forward
FFA1 23       0340      INC  HL           ; )
FFA2 1161FF   0350      LD   DE,DKNO      ; )
FFA5 010200   0360      LD   BC,0002      ; )Copy disk number to DKNO
FFA8 EDB0     0370      LDIR              ; )
FFAA 18CE     0380      JR   LOP1         ; Jump forward to continue
              0385 ;
FFAC CBEF     0390 NEXT SET  5,A          ; Convert to lower case
FFAE B9       0400      CP   C            ; Compare directory with searchkey
FFAF 13       0410      INC  DE           ; Next character in searchkey
FFB0 23       0420      INC  HL           ; Next character in directory
FFB1 28DD     0430      JR   Z,LOP2       ; If characters match continue
FFB3 18C5     0440      JR   LOP1         ; If not try next filename
              0445 ;
FFB5 ED4B5BFF 0450 OUT  LD   BC,(ELNO)    ; )Return to BASIC
FFB9 C9       0460      RET               ; )with element number in BC
FFBA          0470 END  END
```

Figure 3: Listing of Neat Catalogue program

```
1999 CLEAR 65000: REM Neat catal
ogue
2000 LET d = 1: PRINT AT 10,5;"N
EAT CAT ROUTINE": INPUT "WHICH D
RIVE 1 or 2 (1)";d$
2001 IF d$<>"" AND d$<>"1" AND d
$<>"2" THEN GO TO 2000
2002 IF d$<>"" THEN LET d =VAL d
$
2004 GO SUB 8000: LET z$="": CAT
 #14;d
2005 LET p=2: REM selects screen
2010 CLS : INPUT "Lprint y/n";x$
: IF x$="y" OR x$="Y" THEN LET p
=3: IF p=3 THEN OPEN #3;"t";ORND
65
2015 IF p=3 THEN OPEN #4;"b": PR
INT #4;CHR$ (27);CHR$ (87);CHR$
(1);: PRINT #4;CHR$ (15);: REM e
nlarged/condensed
2020 PRINT #p;"Disc name ";z$( T
O 10)
2025 PRINT #p
2030 LET z$=z$(13 TO )
2040 LET f=0: LET n$=". "
2050 IF LEN z$<10 THEN GO TO 210
0
2060 LET f=f+1
2066 IF f>9 THEN LET n$="."
2070 PRINT #p;f;n$;z$( TO 10),
2080 LET z$=z$(12 TO )
2090 GO TO 2050
2100 PRINT #p;''f;" files leavin
g ";z$(2 TO LEN z$-1);" K"
2105 IF p=3 THEN LPRINT "*******
********************************
**************************"
2110 CLEAR #: REM CLOSE #3
2120 INPUT "another disc";x$: IF
 x$="y" OR x$="Y" THEN GO TO 200
0
2130 STOP
7997 REM ***see p16 microdrive b
ook
7998 REM  *stream 14-z$ routine
7999 REM recc let st=65260(no BB
)
8000 LET st=65534-101: RESTORE 8
070
8005 LET c=0
8010 FOR i=st TO st+100
8020 READ a: POKE i,a: LET c=c+a
8030 NEXT i
8035 IF c<>10557 THEN PRINT "che
cksum error": STOP
8050 RANDOMIZE USR st
8060 RETURN
8070 DATA 42,83,92,43,197,229,1,
11
8075 DATA 0,205,85,22,209,33,59,
0
8080 DATA 193,9,213,235,115,35,1
14,35
8085 DATA 235,1,247,255,9,1,9,0
8090 DATA 237,176,225,35,237,75,
79,92
8095 DATA 167,237,66,34,50,92,1,
0
8100 DATA 0,201,196,21,90,40,0,4
0
8105 DATA 0,11,0,245,42,75,92,12
6
8110 DATA 254,90,40,11,254,128,2
02,112
8115 DATA 6,205,184,25,235,24,24
0,35
8120 DATA 78,35,70,3,197,229,9,2
05
8125 DATA 82,22,35,235,225,193,1
12,43
8130 DATA 113,241,18,167,201
```

market shortly and will solve all the problems. As soon as I can lay my hands on one, I'll check it out.

One or two people have had trouble with some Discoveries: continual disc I/O error, and nothing read in. This often means that the stepping motor spline and guide have come adrift, and the locating ball has jumped right out of the spline. It's a piece of cake to put it back, but if the trouble persists, then contact Opus.

Dick Kruithof of the Discovery users' club in Holland asks me once again to mention that the club is very active, with a bi-monthly magazine translated into English. His address is Boeirkade 6, 2726 CH Zoetermeer, Holland.

Finally, please keep the programs coming. I have seen nothing yet which exploits Discovery's random access facility — how about it? Oh, and please do send a disc with your program on it — we will send it back.

Figure 4: Sample printout from Neat Catalogue program

```
Disc name black1

1. buff1CODE 2. buff1      3. newchars  4. TASCODE1  5. TASCTRL
6. TASCODE3  7. T2T3       8. modprinter9. tas       10.tasword
11.TASCODE2  12.TASTABLE   13.tas3      14.run       15.neatcat

15 files leaving 123 K
```

Figure 5: Screen dump from Neat Catalogue program (2 column display)

```
Disc name black1

1.  buff1CODE      2.  buff1
3.  newchars       4.  TASCODE1
5.  TASCTRL        6.  TASCODE3
7.  T2T3           8.  modprinter
9.  tas            10.tasword
11.TASCODE2        12.TASTABLE
13.tas3            14.run
15.neatcat

15 files leaving 123 K
```



Figure 6: Listing of Afterfile program

```
   1 REM program alterfile
  10 OPEN #4;1;"filename"IN
  20 OPEN #5;2;"filename" OUT
  30 PRINT #4
  40 IF USR 432=0 THEN CLOSE #4:
 STOP
  50 INPUT #4;n$
  60 PRINT #2;n$: PRINT "Save? Y
/N"
  70 IF INKEY$="y" OR INKEY$="Y"
 THEN GO TO 100
  80 IF INKEY$="n" OR INKEY$="N"
 THEN CLS : GO TO 110
  85 PAUSE 30
  90 GO TO 70
 100 CLS : PRINT #5;n$
 110 PRINT #2;"New Record? Y/N"
 120 IF INKEY$="y" OR INKEY$="Y"
 THEN GO TO 150
 130 IF INKEY$="n" OR INKEY$="N"
 THEN CLS : GO TO 30
 135 PAUSE 30
 140 GO TO 120
 150 CLS : INPUT "New Record? ";
r$
 160 IF r$="end" THEN CLOSE #5:
STOP
 170 PRINT #5;r$
 180 GO TO 30
```



TRAILBLAZER
Gremlin
£7.95

Gremlin's new arcade release brings out the best in reflex action.

It sounds simple enough — just guide a ball down a highway. Nothing to it you might think but the reality is an excruciatingly addictive game that tests concentration, timing and reflexes to the limit.

The appeal of the game is based on the cunning design of the 14 courses. They vary in length and difficulty and are made up of squares and shapes that produce alarming effects on the ball under your control. Some you can roll across with ease but others will increase or decrease your speed, give you a free bounce or fiendishly reverse the joystick controls.

The properties of each square can be deduced from their shading but the distinction between different squares can be difficult to discern when travelling at speed and it takes quite a while to master the basics.

There are additional hazards. Many of the courses are paved almost entirely with holes to fall down and if you fall from the edge of the path you are consigned to oblivion.

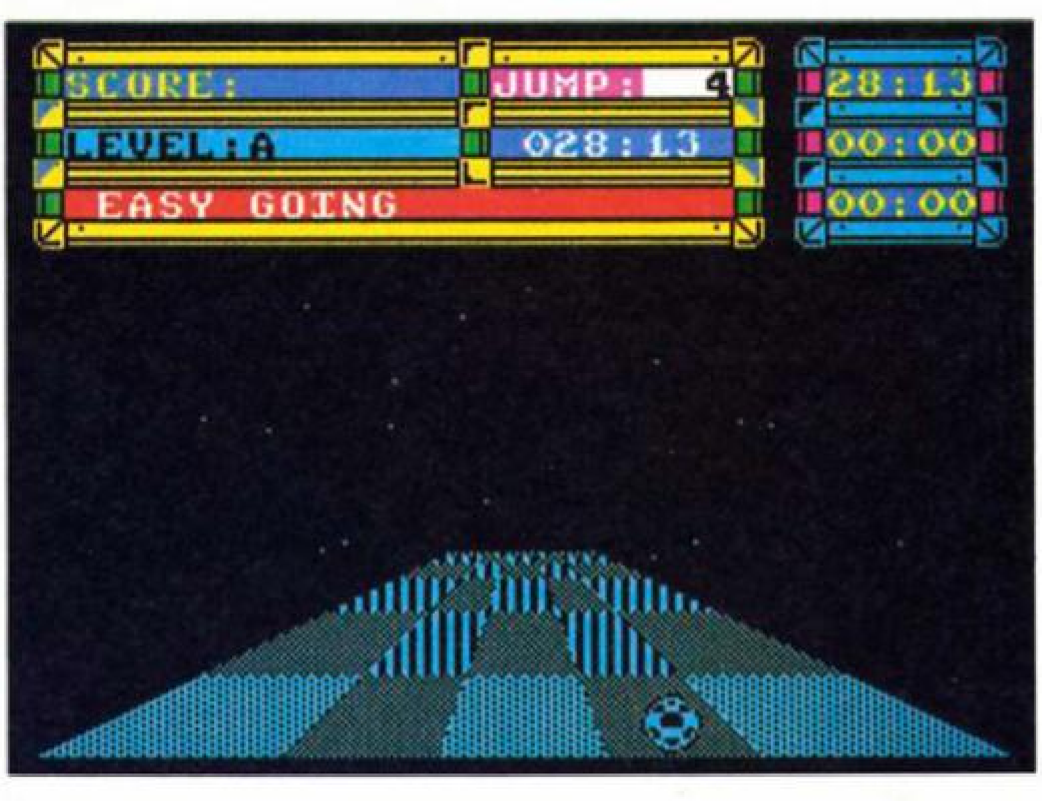
Sensibly for a game of this kind a practice mode has been included which allows you to try any three of the courses in succession. To make it easier you are given unlimited jumps and a generous 99 second time limit to complete a course.

The rationing of jumps means you must search out the 'jump squares' or you won't have enough bounce to get you through. An important element to get right is the rhythm. Once you hit a good streak you can miraculously steam up the road almost without thinking because your reflexes are doing all the work. But if you miss a jump or disappear down a hole it's very difficult to get back into a winning rhythm. This is not helped by the restart which throws the ball up the road in front of you. If it happens to be heading for a hole there is nothing you can do about it and if you are unlucky this disappearing act can be repeated several times before you are back in control.

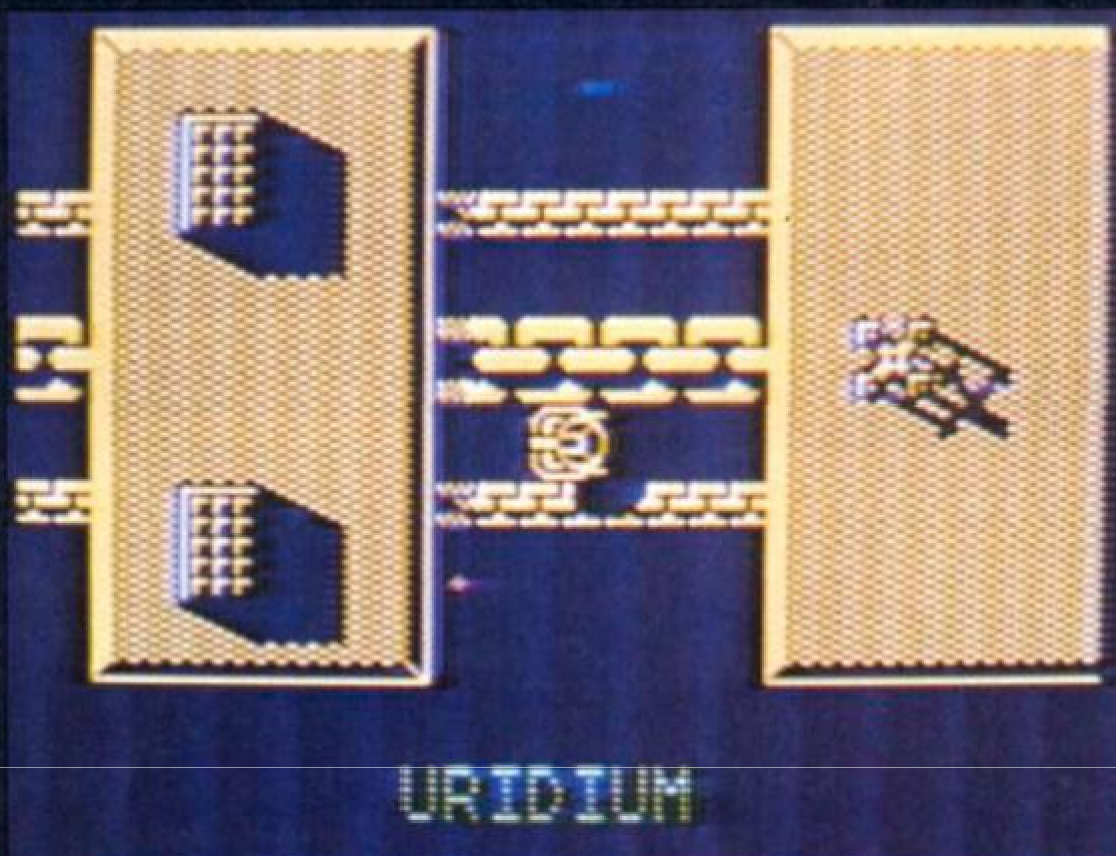
Some courses are made up in part of huge letters which present their own difficulties to bounce across but one advantage is that memorising the letters gives you a clear idea of what to expect next time round. Not surprisingly you will find yourself bouncing across letters that spell out words such as GREMLIN, that is if you don't fall down the hole in the 'R' first.

If you like arcade games you will undoubtedly like Trailblazer, it's fast, demanding and gives you just the right sense of embarrased infuriation when you just miss out on completing a course by a fraction of a second. Trailblazer is certainly not impossible to complete but it is devilishly difficult and is recommended for those who enjoy a challenge.

MONSTER HIT



URIDIUM



A high speed shoot-em-up from Hewson that confounded the doubters.

MONSTER HIT

Uridium
Hewson
£8.95

We seem to be seeing a lot of games at the moment that were deemed impossible to create on the Spectrum even six months ago. Uridium is such a game and the fact that it has been converted so effectively from the Commodore would seem to suggest that the rule book on what is currently possible on the Spectrum will have to be rewritten yet again.

All this is good news for the game player as standards are rising significantly and Uridium is a shoot-em-up which is surprising both in its speed and subtlety.

As with the best arcade games the plot is almost irrelevant, but for the record the solar system is under attack from huge platform spaceships called Super Dreadnoughts. The aliens need the earth's mineral resources and each dreadnought is assigned a different metal ore to collect. This gives the game its structure as you are put in command of a Manta Class space fighter and sent out to destroy first the Lead dreadnought then the Zinc and so on.

The action plays from left to right as opposed to the more traditional vertical shoot-em-up game. Your first objective is to knock out the enemy fighters which protect the dreadnought and then destroy the surface defences. The deck of the dreadnought is studded with structures that you can collide with and there are also generator ports which if you are unlucky enough to activate them dispense homing mines which unless you can outrun them, blow you to smithereens.

Once you have fought your way through all this you fly off the end of the dreadnought and the instruction 'Land now' flashes up. It's then time to double back and land on the main runway of the ship's deck. Even when you think you've accomplished this a mine may be activated and destroy you as you land. Successfully landing enables you to vaporise the dreadnought.

As described, Uridium may sound like 101 other shoot-em-up but it distinguishes itself both by its speed and the manoeuverability of the fighter under your control. A particularly neat touch is the fighter's method of turning — a smooth acrobatic flip which means you can literally turn on a sixpence even when travelling at speed.

The graphics too are impressive with a lot of detail. To avoid attribute clashes Uridium is fashionably monochrome with a change in colour to indicate level changes.

The game can be played with either joystick or keyboard with one or two player options and it's definitely a game that will spark endless squabbles over whose turn it is next to have a crack at the dreadnought.

Uridium proves there is still a lot of life left in the shoot-em-up format especially at this level of sophistication and it is highly recommended for anyone with an itchy trigger finger.



CROSSWIRES

It's been a frustrating month and, yet again, the main issue has been printer compatibility.

RS232 Blues

Dear Sir,

Q *Could you please tell me if there is a lead available to connect the Spectrum 128 to the Saga LTR1 printer. If there is, where may I purchase one and also the price.*
Yours Faithfully,
R.M. Hardie.

A David White of Saga Systems gave us some help here. He explained that the RS232 was developed many moons ago and that not all the means of operation were standardised, this meant that quite a few units which apparently had the same system were incompatible due to manufacturers' variations. One way in which Sir C's machines differ is that they do not send a STOP bit, each new START bit also indicates the end of the previous data. Anyway, the upshot of it all is that the LTR1 uses a slightly different protocol and really you need to purchase a separate interface, preferably a CENTRONICS type such as the KEMPSTON E or the ZX LPRINT 3.

However there are also pitfalls here as this letter from Hugh G. Barnett highlights:

Kempston E

Dear Sir,

Q *I have an Epson compatible printer, a Kempston E interface and a 48K Spectrum which I have replaced with a 128. The printer and interface combination works on both 48K and 128K in 48K mode but I have no joy in getting the printer to work with the 128 in 128K mode, Can you help?*

Kempston seems to have gone out of business, at least I couldn't get a reply from their phone, can you confirm?
Hugh Barnett.

A Last things first, Kempston have not gone out of business and they have just produced a new joystick interface to prove it! But I know what you mean about their telephone service!

Actually the 128K mode is really like using a completely different computer and in most cases needs separate and different interfaces. So for printer operation we're back to the RS232 (ARRGHHH!). There is just one glimmer of hope in that Technology Research Limited, old friends of ours with their Beta+ disk interface, have produced a unit which converts the RS232 output to standard CENTRONICS output from the Spectrum 128 RS232 port.

TRL have a good reputation and this may prove the answer to many problems it is priced at £19.00 from them at Unit 18, Central Trading Estate, Staines, Middlesex. Tel 0784 63547 for further details. Of course it doesn't operate in 48K mode as the RS232 is not accessable.

Meanwhile Steven Partridge asks if the STAR STX-8 will work with the Interface 1 RS232. The answer is NO because the STX-8 has a Centronics port and you would have to buy a suitable interface.

Finally on this subject is a letter from Derek Gare who purchased an Interface 1 RS232 to Compact 8056 printer cable specially marketed by Dixons at £9.95.

It didn't work.

The trouble with using many peripherals simultaneously is that the problem could lie in any one of them. First I would suspect the lead and try to test it with another system of Spectrum/IF1/Printer and if it still fails then it is definitely likely to be that the lead is connected wrongly or perhaps damaged. Of course your IF1 could have a fault or the printer may be faulty or the Spectrum may not be sending properly . . . all these faults have been known!

Mouse Trouble

Dear Sir,

Q *I am considering the possibility of buying an Opus Disk drive to improve the performance of my Spectrum+ system which I use mainly for wordprocessing, but I'm afraid the AMX mouse could not be connected to work properly.*
D. Bar-on,
Israel.

A I phoned both Opus and AMX and both companies were very helpful, Opus confirmed that there were no hardware conflicts and that any problems would be software based.

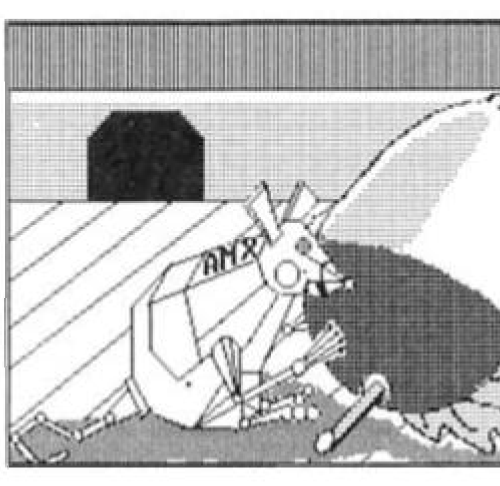
Roger Smith of AMX was extremely helpful and stated that there was a software incompatability at the moment but he also said that they were presently working on a version which would operate with the Opus. His advice was to wait for a couple of months then give them a call regarding the situation, he was sensibly unwilling to make any firm commitments, although personally confident that they should be producing something soon. AMX is on 0925 413501, and as soon as they let us know anything we'll pass the info on.

Dear Sir,

Q *I have a problem with my Spectrum 48K and ZX Interface 1, in order to connect to the French Teletel system (nearly equivalent to your Prestel system), I need to change the format of the RS232 channel to 7 Data, even parity and one stop-bit instead of the default format.*
Sincerely Yours,
Philippe Danis,
France

A Unfortunately I don't know of any way to reprogram the RS232 and as far as I know it is not possible due to Sinclair's interpretation of the RS232 protocol. Possibly reprogramming the complete Inerface 1 RS232 operating system may work, but this is far too complex a job to undertake here.

The most simple solution would be to purchase a Modem which will do this specific task, there are some quite reasonably priced ones available at the moment, the PRISM VTX5000 can be purchased for around £45.00 and Maplin do a versatile RS232 interface quite cheaply. And while we're on this topic . . .



STREAMS AND CHANNELS

PART ONE by TONI BAKER

Streams and channels might sound like computer jargon, but if you can master them you can control some powerful new facilities.

Whenever we PRINT something, or INPUT something, we are making use of streams and channels. PRINT really means PRINT#2, although the #2 is often omitted. Similarly, INPUT really means INPUT#0, and LPRINT means PRINT#3. The number after the "#" symbol is called the STREAM NUMBER.

Now, not every stream number is usable. If, after switching the Spectrum on, you type PRINT#6, you'll get an error report "0 Invalid stream". This is because stream number 6 is not attached to a CHANNEL, so before I do anything else I'd better explain what a CHANNEL is.

A CHANNEL is a device used for either inputting or outputting (or both) bytes of data. The TV screen is channel, since characters may be printed onto it. Every channel has a name, consisting of a single letter of the alphabet. The screen is called channel "S", because "S" stands for Screen. An OPEN # statement is used to attach a channel to a stream, so if you type in the BASIC statement OPEN#6,"S" then from now on, whenever you use PRINT#6; the output will be printed to the screen.

Similarly, the keyboard is a device used for inputting, therefore it too is a channel. It has a name — "K" for Keyboard. You can attach a stream to the keyboard just as easily as to the screen: OPEN#N,"K" will attach stream number N to the keyboard. You can have a maximum of sixteen streams altogether, and these are numbered from zero to fifteen. There is no such thing as stream number sixteen, and if you attempt to use it then you'll get an error message. Streams zero to three, however, are already spoken for. Stream zero and stream one are both attached to channel "K" (the keyboard), stream two is attached to channel "S" (the screen), and stream three is attached to channel "P" (the printer).

Channels "S" and "P" can only be used for *output*, so PRINT#2; is allowed, but INPUT#2; is not. surprisingly though, channel "K" can be used either for inputting or for outputting. INPUT# 0; is the same as a conventional INPUT statement, but PRINT#0 will print onto the lower two lines of the screen (where INPUT text normally appears). If you follow a PRINT#0; statement with PAUSE 0, for example, then you'll see this effect in action.

CHANNEL 'P'

Channel "P" is a weird one. On the 16K and 48K versions of the Spectrum, and also on the Spectrum 128 and 48K mode, channel "P" is the ZX Printer. On the Spectrum 128 and 128K mode, however, channel "P" is the built in RS232 socket, into which you can plug a compatible printer, another computer, or anything else you feel like. Incidentally on the Spectrum 128 in 128K mode you can also INPUT from channel "P". This simply means that the computer can accept data from its RS232 port, which means that two computers can effectively talk to each other via this link. It is not possible to print to a ZX type Printer from the 128 in 128K mode, at least not in BASIC, but that's where this series comes in.

If you have connected a ZX Interface One then there will be other channels too. Channel "M" — the microdrives; channel "N" — the network; channels "T" and "B" — Interface One's RS232 port (as opposed to the Spectrum 128's RS232 port).

This, then, concludes the list of standard channels available on the Spectrum, but the use of channels to do anything else is vastly under-rated. This four-part series is devoted to changing all that. It is the purpose of this series to explore strange new programming techniques, to seek out new channels and new information, to boldly split infinitives which no stream has split before.

We shall invent, in machine code, new channels which can print to the screen in large or small letters; new channels which will allow the use of WINDOWS on the screen (a la QL); new channels which allow completely successful communication between Spectrums and QL's over the network; new channels which enable the ZX Printer to work on the Spectrum 128 in 128K mode; new channels which will allow users of the Spectrum 128 to make use of Read and Write files in RAM-disc.

C.I.A.

So how does it all work? Well that is the question I intend to answer in *this* article. It all hinges on an area of memory that you probably haven't used before, called the "Channel Information Area", and which

happens to be situated directly below the BASIC program area. To create a channel you merely have to organise the memory in the channel information area in the correct way, and of course, provide the machine code to effect PRINT and INPUT to and from the channel. Here's how it works.

Every channel must have a "Channel Information Block" stored in the channel-information-area. This is simply a chunk of memory dedicated to the channel, containing all of its system variables and the addresses of its input and output subroutines. The three primary channels "K", "S" and "P" all use only five bytes, but they are exceptions. All other channels require a minimum of eleven bytes, as we shall see.

Incidentally, there is a fourth primary channel (that is, a channel available on the unexpanded standard Spectrum) called channel "R", but it is only available in machine code. We'll learn more of that later.

The channel information blocks for these four primary channels look like this:

Bytes 0 and 1:Address of PRINT#routine.
Bytes 2 and 3: Address of INPUT#routine.
Byte 4:Name of channel (ASCII character code).

The Interface One channels all need a minimum of eleven bytes, and their channel information is addressed by the IX register. Their channel information blocks look like this:

IX+00 (2 bytes):The address 0008.
IX+02 (2 bytes):The address 0008.
IX+04:Name of channel (ASCII character code).
IX+05 (2 bytes):Address of PRINT#routine (in Shadow ROM).
IX+07 (2 bytes):Address of INPUT#routine (in Shadow ROM).
IX+09 (2 bytes):Length of channel information block (minimum 000B).
IX+0B:Any additional information.

ROM ROUTINES

The standard PRINT and INPUT subroutines in the ROM (RST 10 and CALL 15E6,INPUT_AD) will "expect" a primary channel. Therefore, control will jump to the address given by bytes 0 and 1 (for RST 10), or to the address given by bytes 2 and 3 (for INPUT_AD). In the case of the Interface One channels, this address will in both cases be 0008. At this address the Shadow ROM is paged in and a routine in the Shadow ROM will redirect control to the address given by (IX+05/06) or (IX+07/08).

Our channels will look different again. We too shall use IX to index the channel information, however our channels will look like this:

IX+00 (2 bytes):Address of PRINT# routine.
IX+02 (2 bytes):Address of INPUT#routine.
IX+04:Name of channel (ASCII character code).
IX+05 (2 bytes):The number 1234, which identifies this as a user defined channel.
IX+07 (2 bytes):Address of CLOSE#routine.
IX+09 (2 bytes):Length of channel information block (minimum 000B).
IX+0B:Any additional information.

STREAMS ARE IMPORTANT TOO

You see, each stream has its own unique two-byte system variable. STRMS_00 is at 5C16, STRMS_01 is at 5C18, and so on. In addition there are three streams which are available in machine code but not in BASIC. These are stream FD, stream FE, and stream FF. They too have system variables. STRMS_FD is at 5C10, STRMS_FE is at 5C12. and STRMS_FF is at 5C14. Stream FD is permanently attached to channel "K" and should not be changed. Similarly, stream FE is permanently attached to channel "S".

Stream FF is interesting. It is permanently attached to channel "R" — an internal machine code channel, which is capable of inserting bytes into the Spectrum's dynamic memory layout. We'll make use of this feature later on.

The STRMS variables themselves link the stream to the channel. If the STRMS variable for any particular stream contains 0000 then it means that the stream in question is closed (ie it has no channel attached to it). If the variable is non-zero then the stream is attached to a channel. In particular it is attached to the channel whose channel information block begins at address (CHANS)+(STRMS_n)−1.

It follows, therefore, that it must surely be easier, from a machine code point of view, to OPEN a channel than to CLOSE it, since to open a channel all you have to do is to make room for the new channel information at the end of the CHANS area, and to assign the appropriate STRMS variable to attach the stream to. closing such a channel, on the other hand, may be more difficult, because if the channel

Listing 1

```
                        ORG 8000
08        CLOSE_A       EX AF,AF'              Store the carry flag.
CD2117                  CALL 1721,STR_DATA_A   HL: points to STRMS info.
                                               BC:= STRMS info.
78                      LD A,B
B1                      OR C
C8                      RET Z                  Return if stream already closed.
E5                      PUSH HL                Stack pointer to STRMS info.
21E2A3                  LD HL,A3E2
09                      ADD HL,BC
E1                      POP HL                 HL: points to STRMS info.
D0                      RET NC                 Return if channel is K,S,R or P.
DD2A4F5C                LD IX,(CHANS)
DD09                    ADD IX,BC
DD2B                    DEC IX                 IX: points to channel info.
DD7E05                  LD A,(IX+05)
FE34                    CP 34
C0                      RET NZ                 Return if not a user defined channel.
DD7E06                  LD A,(IX+06)
FE12                    CP 12
C0                      RET NZ                 Return if not a user defined channel.
3600                    LD (HL),00
23                      INC HL
3600                    LD (HL),00             Load STRMS info with 0000 to
                                                  signal "stream closed".
C5                      PUSH BC                Stack CHANS displacement.
DD6E07                  LD L,(IX+07)
DD6608                  LD H,(IX+08)           HL:= address of CLOSE # routine.
08                      EX AF,AF'
DC2C16                  CALL C,162C,CALL_JUMP  Call subroutine if required.
```

▶ ▶ ▶

```
DDE5                        PUSH IX
E1                          POP HL               HL:= address of channel info.
DD4E09                      LD C,(IX+09)
DD460A                      LD B,(IX+0A)         BC:= length of channel info.
C5                          PUSH BC              Stack length of channel info.
CDE819                      CALL 19E8,RECLAIM_2  Reclaim memory used by channel.
3E10                        LD A,10              A:= number of streams.
21165C                      LD HL,5C16           HL: points to STRMS data for strm 0.
22745C       C_LOOP         LD (T_ADDR),HL       Store STRMS pointer.
5E                          LD E,(HL)
23                          INC HL
56                          LD D,(HL)            DE:= STRMS data for stream A.
C1                          POP BC               BC:= length of channel info reclaimed.
E1                          POP HL               HL:= CHANS disp of channel closed.
E5                          PUSH HL
C5                          PUSH BC
A7                          AND A
ED52                        SBC HL,DE
300B                        JR NC,C_CONT         Jump if channel info for stream
                                                   A has moved.
EB                          EX DE,HL             HL:= strms data for stream A.
A7                          AND A
ED42                        SBC HL,BC            Reduce to allow for reclaimed area.
EB                          EX DE,HL             DE:= modified STRMS data.
2A745C                      LD HL,(T_ADDR)       HL: points to STRMS data.
73                          LD (HL),E
23                          INC HL
72                          LD (HL),D            Store modified data.
2A745C       C_CONT         LD HL,(T_ADDR)       HL: points to STRMS data.
23                          INC HL
23                          INC HL               HL: points to next STRMS variable.
3D                          DEC A
20DE                        JR NZ,C_LOOP         Repeat for all sixteen streams.
F1                          POP AF
F1                          POP AF               Balance the stack.
C9                          RET
```

information block is not the last one in the CHANS area then all of the channel information blocks which follow it will have down in memory, which in turn means that the corresponding STRMS variable will have to be altered accordingly. Any or all of the STRMS variables may have to be altered if this is the case.

CLOSE_A

The main program accompanying this article is called CLOSE_A. It's purpose is to close one of our new channels. On entry the A register must contain the stream number to be closed. If the stream is already closed, or if the channel is not one of our user-defined ones, then the subroutine will return, having done nothing. If, on the other hand, the stream specified *is* attached to one of our new channels then the routine will close the channel, reclaim memory used by that channel, and adjust any of the STRMS variables required. The carry flag must also be assigned on entry. If the carry flag is set it means that any data stored in buffers must be sent out, but if the carry flag is reset it means that any such data is to be ignored.

Also included is a program CLEAR_CHANS which will close all such user defined channels. Any data stored in buffers will be lost is this routine is called.

You may think it strange starting with a CLOSE # routine, whilst not having an OPEN # routine, but that's where the cliff-hanger comes in. *Next* month I'll start opening some new channels — in particular I'll deal with printing to the screen in large or small letters. Remember that once a channel is opened it may be used at will in BASIC. As soon as you have a channel which can print sixty-four characters across the screen then you can use a common or garden BASIC PRINT statement to print things to the channel.

Study the programs I've listed. They are *not* relocatable, because they are designed to link in with all the other bits of program which you'll get in the next three episodes. If you still haven't properly understood the concepts of channels or streams then maybe next month you'll be a whole lot wiser, when I shall start giving you some concrete examples of the ideas in use.

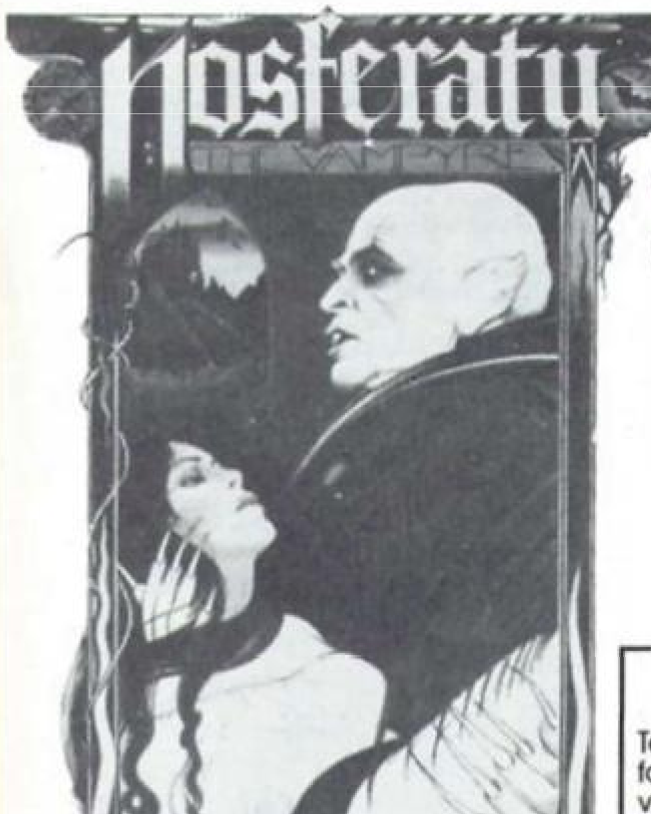
See you then.

Listing 2

```
                            ORG B069
3E10         CLEAR_CHANS    LD A,10              A:= number of streams.
3D           CC_LOOP        DEC A                A:= next stream number.
F5                          PUSH AF              Stack strm number and zero flag.
A7                          AND A                Reset carry to signal "Do not
                                                     send data".
CD00B0                      CALL B000,CLOSE_A    Close stream A if it is a user
                                                     defined stream.
F1                          POP AF               A:= current stream number.
20F7                        JR NZ,CC_LOOP        Repeat for all streams.
C9                          RET
```

Nosferatu

COMPETITION



STAKE YOUR CLAIM

. . . to Nosferatu, Piranha's nightmarish new game, by entering our Vampire trivia quiz.

Thirty ZX readers can join the vampire hunters in their quest to destroy Dracula.

Based on the film Nosferatu, this game puts you in control of three characters who must do battle against the master of the vampires himself.

As one of the characters, Jonathan Harker, you must retrieve the deeds to a house in Wismar that Dracula has purchased. If the Count is allowed to move in nothing can stop him from turning the townspeople into an undead community overnight.

Jonathan's wife Lucy must be kept alive at all costs as she is the only one who can ultimately destroy the fanged aristocrat. Jonathan has the help of a world famous Vampire hunter but even before the serious business of hunting down Drac can begin they must subdue the plague rats that infest the town and eradicate those who have already succumbed to Dracula's power. There are many more daunting tasks to complete before the deed is done and the town is saved from the curse of vampirism!

Drac Fax

To enter, simply answer the following three questions on vampire lore.

1) When is a Vampire most vulnerable?
a) Midnight
b) Dawn
c) The early hours of the morning

2) What is the name of the most famous vampire hunter of them all?
a) Van Den Plas
b) Van Helsing
c) Van Rental

3) What material can keep vampires at bay?
a) Paprika
b) Garlic
c) Steaks

The competition is open to all ZX readers except employees of Argus Specialist Publications, Piranha Software, and Chase Web. Any entries from vampires will be disqualified. (If you are not sure whether you are or not try posting your entry in daylight.)

The closing date for entries is January 7th 1987. Please remember to put the letters relating to your answers on the outside of the envelope.

NOSFERATU COMPETITION

The answers to the bloodcurdling questions are

1. ....

2. ....

3. ....

Name ....

Address ....

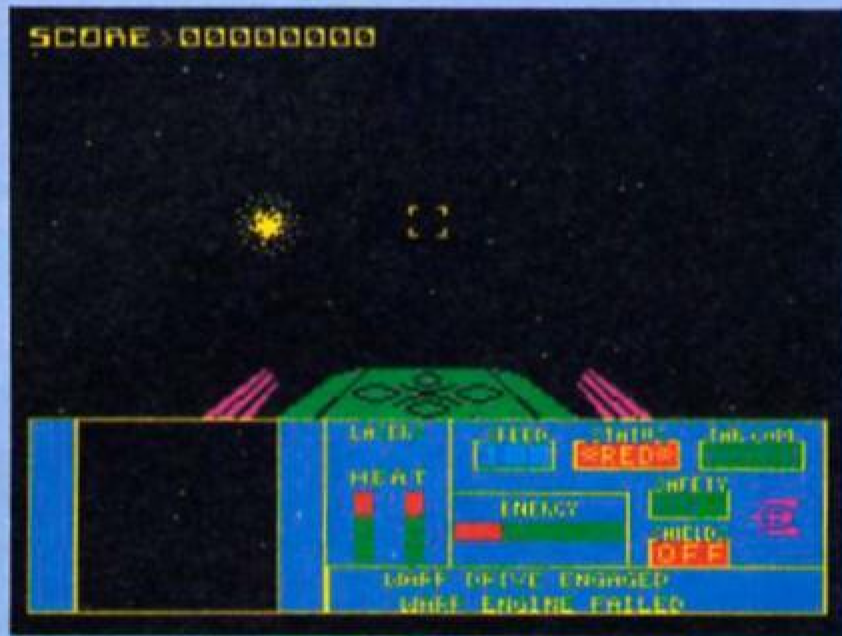
....

....

Send your entry to Nosferatu Competition, ZX Computing Monthly, No 1 Golden Square, London, W1R 3AB.

GAMES

NOW GAMES 3
Virgin
£9.95



Old games don't die, they just turn up on compilations! (or on budget labels).

Seriously though, I think this is an excellent way of offering programs which have outlived their shelf life. The essential point is are they still worth having? On this cassette I would say a definite **yes** and the collection comprises of:

Nick Faldo Plays The Open, this was a Mind Games original and provided one of the most enjoyable golf games that I've ever reviewed, graphics being good, the holes a fairly accurate representation of the Royal St. George's golf club and the control being by an icon style graphic window system.

Sorcery is a graphically excellent arcade game of the 'work it out yourself' type in which you are challenged to complete some 30 screens within a time limit, it sounds simple, but believe me it aint!

Everyone's A Wally was the second of the MikroGen classics featuring large well animated, near cartoon quality graphics. It also featured very few details of what you had to do and resulted in almost frantic pleas for help from many readers and provided quite a lively postbag for a few months.

Codename Mat 2 is described as a lively shoot 'em up. This is an understatement. It is an extremely complex game demanding strategy and concentration to cope with a wide range of details as well as the hectic and high speed battle sequences. It's much more than a simple 'zap them all' game.

View To A Kill, Domarks much hyped and eventually disappointing three part program. Not that it was bad, just that it was rather lacking in any real atmosphere or technique and appeared dated at the time of its launch. As part of this collection it is worth having for the occasional play.

If you were to purchase these separately they would have cost you over £30, so in pure monetary terms this cassette represents good value. There is a good selection of games and they should provide something for most gamespersons, each of the programs is still worth having in its own right.

My only criticism is the instructions which are provided on an expanding insert. Apart from MAT 2 which takes up at least half of the insert, they are confused in places and edited to be almost useless in others. WALLY takes only 11 lines and I can imagine some players simply not bothering trying to play it as it is without even the basic plot!



DRAGON'S LAIR
Software Projects
£8.95



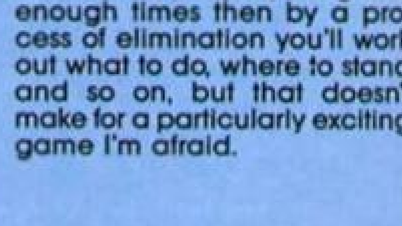
What made the original Dragon's Lair such a hit when it first appeared in the arcades was the quality of the graphics made possible by the laserdisc system in the arcade machine, and as somebody said to me while I was playing it — "it loses something in translation from laserdisc onto the Spectrum, doesn't it?"

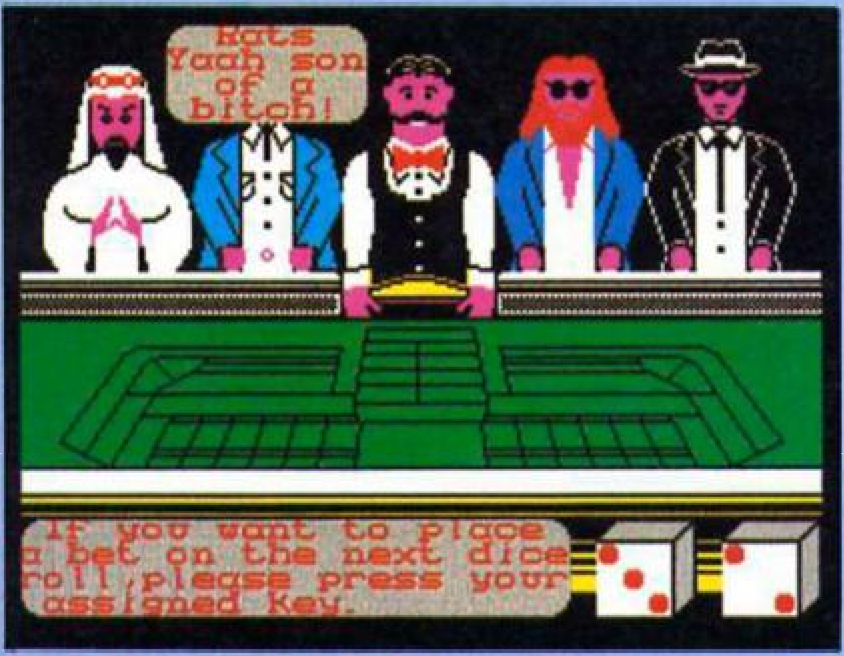
Surprisingly enough, it's not the graphics that are the main let down here — they may not be up to laserdisc standard, but they are perfectly acceptable — it's the gameplay. I found the game so hard to play, and spent so much time trying to get past the early stages that I just gave up in frustration after we'd had the game for about a week.

For a start, the loading and setting up instructions aren't very good. The prompt to press a key to start a game appears before the option to select joystick/keyboard controls, which is a bit daft, and it took me about fifteen minutes just to work out how to select the controls and get started. I nearly gave up before I'd even got started.

There are nine sections in the game, including falling discs, burning ropes, the Tentacle Room and so on, all taken from the arcade version, but I wanted to give up after two days of trying to get past the very first section. This was the falling disc, where you have to keep Daring Dirk on the disc as it descends the shaft into the dragon's castle. As you descend, an Air Genie keeps appearing to try and blow you off, and you have to keep Dirk balanced on the disc. But the stupid demon starts blowing before it appears on screen so you've hardly got any chance at all, unless you can guess where it's likely to appear.

The main problem is that it's hard to judge when you're doing the right thing. There are times when it looks like you're positioned in the right place to hit something or leap across a gap, only to find yourself dying on the spot. In the end the game becomes more a matter of trial and error than of skill or reflexes — if you play the game enough times then by a process of elimination you'll work out what to do, where to stand and so on, but that doesn't make for a particularly exciting game I'm afraid.





MIAMI DICE

Bug-Byte
£2.99

Apart from the awful pun and absolutely no connection to the TV show of similar name, this is a very good gambling type game on the lines of the common fruit machine or card games or, probably closest of all, roulette.

The game is that of American Craps, a two dice game which anyone who has watched any made in the USA films or TV shows may well have seen the characters playing and perhaps even wondered what they were doing in an odd moment of disinterest.

Actually the game is quite complex and the rules and options take a little time playing to get used to, there being several choices with different odds on each throw.

As with most of this type, its success depends on the presentation and any atmosphere the program can generate, after all there is quite a difference between risking £100 of your own money and £100 imaginary computer cash.

To this end a good selection of characters are available to play. Each can be renamed and chosen to join in the game or not. Up to four players can play and these are represented by pleasant caricatures on screen. The screen presentation is colourful and clear, control is by keyboard and once mastered is easy and effective, although at first I found it confusing and awkward.

I couldn't get the Space key option to function, but this could be due to the Transform keyboard I was using, it sometimes causes slight problems. Although you can play on your own it wasn't until I persuaded a few friends to play as well that any real challenge and enthusiasm developed, then it became quite absorbing and enjoyable.

If you enjoy board games, card games, dice games or are an avid gambler and intend to visit the USA and want to practice this national game before risking your own cash then this is a must. Just out of curiosity it is interesting to know how the game is played, it makes sense of a few American comments in some films and series.



GALIVAN

Imagine
£7.95

At least I think it's called Galivan, as the various bits of packaging can't seem to decide whether it's Galivan or Galvan. Anyway, whatever the guy's name is, he's the last member of the Cosmo Police and has been sent to the planet Cynep to destroy the demons who have been terrorising the galaxy.

The planet surface is riddled with Techno Caverns, where lurk all manner of dangerous robots and aliens, and at the end of each level of caverns there is a multi-headed demon who has to be destroyed before you can pass onto the next level. Earlier Cosmo Policemen who have passed this way have left behind them a number of Power Pyramids, and if you can find these they will boost your energy and provide you with a series of increasingly powerful weapons.

The game reminds me of an old Quicksilva title that I used to like called Mighty Magus, in that you have a sideways-on view of a maze rather than the usual overhead view, and have to wander up and down between levels in order to find the correct route to the deepest level.

The graphics are good, and all the moving sprites, though small, are finely detailed. But for some reason the programmers have placed a large box at each side of the screen display so that the actual area showing Gal(i)van in the caves is very narrow. This spoils the game a little, since it means that any creature approaching from the sides is right on top of you as soon as it appears on screen, which doesn't really give you enough time to react and defend yourself. And while the animation is good, the 'jump' control seems to respond too slowly — there's a noticeable delay between pushing the joystick up and actually seeing your figure jump.

These things don't ruin the game, and I have to admit that I enjoyed blasting my way around the caves, but they do make it less addictive in the long run as you can often find yourself getting hit and losing lives through no fault of our own. So, nice game, good graphics, but not a classic.





TIMETRAX

Mind Games
£8.95

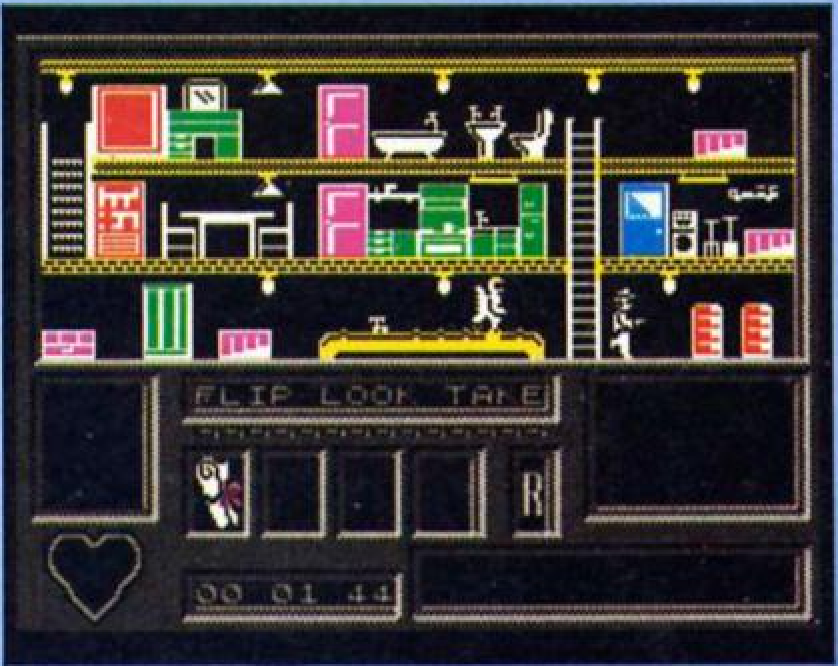
This is one of those games for budding Einsteins, in that it requires you to think about several possible actions and options for each problem encountered.

The manual supplied with the game is ten pages long and is written in rather small print, the first page is given over to the plot and the rest are descriptions of possible actions. They recommend that you read it carefully before playing and it is a good idea.

It is a very frustrating and challenging game, there are elements of many other programs within it, including a well animated and colourful action area of the screen. The animation is a bit on the slow side though but it's certainly not just a simple arcade game.

The display is broken into sections and the largest, top half of the screen, is the three level action screen, here your character walks, climbs, jumps and shoots at other beings. Mind you, try as we could we were unable to find the pistol which was supposed to be on the start screen.

Below this is a set of windows which give the items found and



carried, eye display, visual display, energy display, time, tiles, ammunition, function and menu choices. The Menu window is perhaps the second most important in that it allows you to perform many tasks not immediately possible from the action screen, such as Look, Take, Use, Drop, Swap, etc.

There are potions and spells to find and use, time portals to transport you to another era, weapons to discover and their ammunition, chests, keys and eight minds which have to be given their correct item. There is even a variation of the 'Mastermind' type of game thrown in at the end!

A real mindboggler of a game, this one reminds me of Swords and Sorcery, but it is a much more complex and well designed game. Not really suitable for those who want a simple shoot 'em up, but if you found the Wally games a doddle and have a few millenia to spare try Timetrax.



S.T.O.R.M
Mastertronic
£1.99

This is a straightforward maze chase. A 'find and kill' game but with the unusual option of allowing two simultaneous players. The plot is that Corrine, wife of Storm the Warrior, is a helpless prisoner in Una Cum's laboratory lair. Una Cum has left his castle to search for a box called the Fear.

Meanwhile Storm and his comrade the wizard Agravain Undead venture into the lair and have to deal with the traps and minions on Una Cum to collect the three snake brooches needed to effect the rescue of Corrine. A single player is unexpectedly cast as Agravain and two players choose between the two.

Apart from the rather inconsistent fact that Agravain seems to be the main character, there is no joystick option and that the title implies that the letters are initials rather than a name, there is not a lot wrong with this game.

Instructions are offered on screen and are well written in a redesigned character font. The game screen itself is an aerial view of the action and is colourful and clearly designed, movement is smooth and there appear to be no colour clashes though animation is minimal.

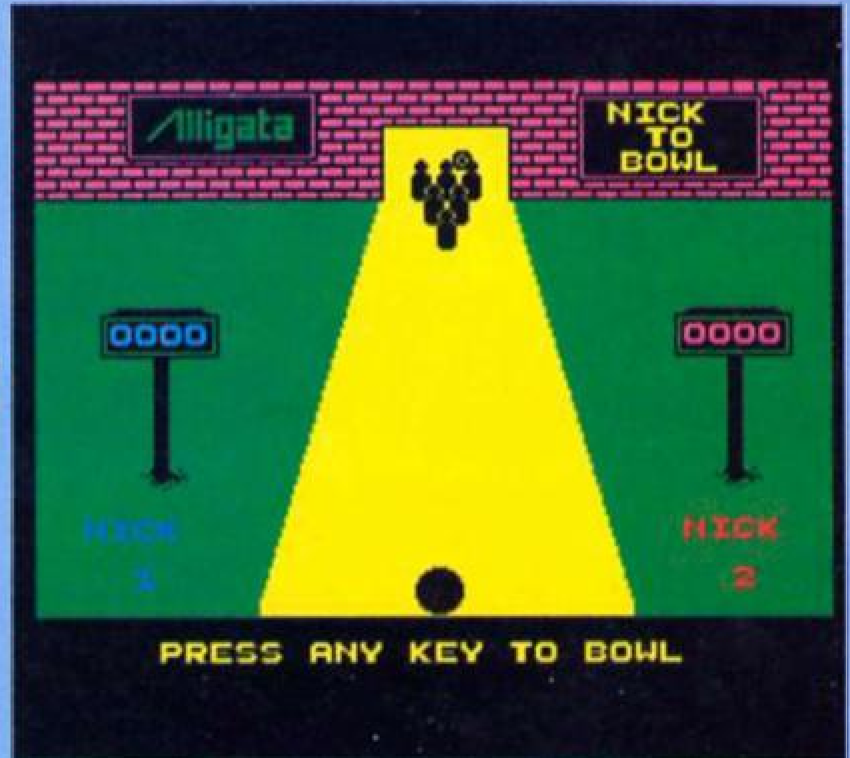
Screens have covered areas which your character and your opponents walk under and are partly obscured making life a little bit more difficult. Control keys are NMLP and ENTER for STORM (representing LRUD and fire), and XCAZ for Agravain plus CAPS and U for using a scroll or mask.

A joystick option would have made playing much easier and if the Sinclair or RAM turbo interface had been catered for then you could still have kept the two player option.

Although this is not a classic game there is enough gameplay and atmosphere to provide a few hours of happy wandering around in the mazelike rooms. Attackers are many and varied and need constant fending off, fighting is a bit disappointing and an attack seems to consist of an enemy standing in front of you blocking your path. Death seems to come quickly and unexpectedly (at least for me it did), and this was probably due to my not finding and consuming the food and drink provided in some rooms.

Fair value at this price for arcade game lovers.





PUB GAMES
Alligata
£9.95

Presented in a jokey manner with a cartoon style insert and opening page this tape contains seven very reasonable games of the type found in many of our traditional drinking establishments.

The program begins by asking for the names of the two players and if you want to play a complete competition set of all games or separate games in practice mode.

The games are Darts, Bar Billiards, Dominoes, Table Football, Pontoon, Poker and Skittles. I will just mention here that although it is called skittles the game presented is actually ten pin bowling, quite a different thing as real players will tell you.

Each game consists of a predetermined number of goes, for instance in Pontoon each player has ten games against the bank, other games you play against each other. Money is the measure of your success and it is nice that the limits mean that you can only end up with a reasonable amount at the end, I find it difficult to believe in games where you end up with money in fantastic amounts.

Each game loads in separately and they are contained on the two sides of a long cassette tape, rather like the Sporting Events games, this means that there are several 4/5 minute periods when you have to wait for the next section to load. Some of the games were less interesting than others, but this comes down to personal taste, it would have been nice if you could have had the option to select those you wanted to play from the start rather than have to play them all.

I can remember a program to play Darts alone which cost about £5, so all in all, if you enjoy this type of computer games simulation then it is good value for money.







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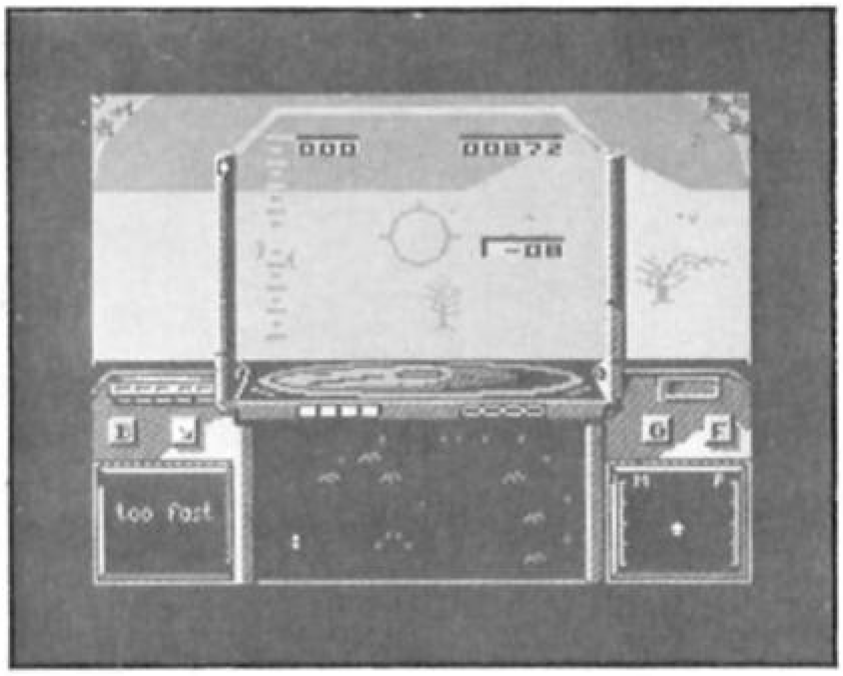
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Strike Force Harrier

Mirrorsoft
£9.95

This is an excellent flight simulator, a complex combat strategy game and an impressive shoot-em-up all rolled into one. The strength of this impressive and well thought out package is that it's enjoyable to play on all these levels and accommodates itself to the inept novice as well as the experienced simulator flyer.

At the learner's level you can get your flying skills tuned up by using the practice mode, or if you want to get straight into aerial combat opt for combat practice mode which gets you straight into a dog fight.

As you are flying a Harrier jump jet there are not one but three methods of taking off — there's the conventional runway take-off, a short version for quick escapes and, of course, the vertical take-off. Similarly you have three types of landing techniques. All these are relatively simple to master (unlike a lot of flight simulators) and sensibly the challenge of the game is placed on your ability to pull off manoeuvres in the air rather than making the routine elements such as take off and landing unnecessarily difficult.

As you would expect the game is best played using a joystick but you'll also be making full use of the keyboard which is chock full of single key commands for weapons systems, flight controls and radar systems. The cockpit display is packed with instruments but it's all essential and nothing has been included just for effect. A nice touch is the tinted windscreen which houses a digital compass and height indicator, speed and vertical speed monitors, a pitch indicator and an all-in-one gunsight and roll indicator. Below them there are indicators for brakes, gear and flaps as well as warning and damage monitors. Along the bottom of the display are guages for fuel and thrust (which doubles for a message screen, air attack radar and what is known as the FOFTRAC map (Friend or Foe Tracking Radar). The FOFTRAC map shows the landscape in the sector you are flying through as well as your own position and the location of enemy forces. Unfortunately it's often difficult to tell just what is going on in the sector as the symbols are very small and the registering of your own position at times seems erratic.

Once you have acquainted yourself with the aircraft and its capabilities you can then attempt a mission. There are three levels of skill to choose from, Pilot, Commander and Ace. The upper levels act as a sort of handicap, calling upon you to use greater flying skill and more accurate marksmanship to succeed.

The mission is to destroy the enemy's headquarters 250 miles away and the action takes place over a massive 512 sector map which contains over 3000 mountains, 3500 surface to air missile sites and over a thousand tanks. First you must fly a reconaissance mission over the area you wish your ground forces to overrun, then establish a base before the ground troops can move up. Then it's onto the next sector. If this all sounds a bit strategical it is, but there's plenty of opportunities to blast hell out of enemy planes and tanks. The mission will certainly take a lot of time and effort to complete and is ideal for those who like to become totally absorbed in a battlefield simulation.

An informative and comprehensive 28 page manual comes with the game and at the back are illustrations of defence and attack manoeuvres with evocative names such as The Scissors, The Split S and The Immelman. These are meant to resemble closely actual tactics used by Harrier pilots. In addition there is also a sheet which gives an illustrated guide to the cockpit and the keyboard keys. On the reverse side is the grid of the combat area which can be used for mapping.

Strike Force Harrier has been designed to be as authentic as possible and will probably exceed your expectations of a package of this kind.



Olli and Lissa

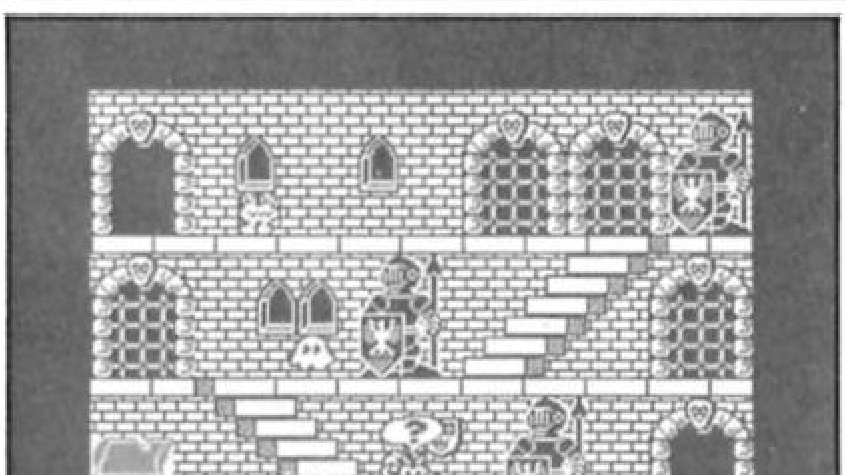
Firebird 199 Range
£1.99

Despite the uninspiring title, and the even less inspiring cassette picture, this programme is a gem.

It's a "jump-the-levels-and-moving-creatures, collect-the-objects-and-take-them-to-the-right-place" type of game. In this particular variation you have to collect a single item per screen and take it to Lissa (or go close to where she is) so that she can make a potion to make their friendly ghost invisible. Once the ghost is rendered invisible then he can scare off the American purchaser of the castle, who wants to export it to the US of A. Loads of political and social comment here!

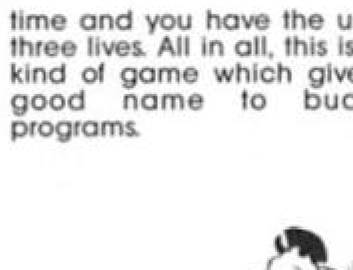
So what, you say, surely it's yet another manic miner clone? I have to agree, but the animation and backgrounds are nothing less than superb and this lifts it into a different league. The animation of your control character is brilliant, the closest I have seen to cartoon quality yet, and the death and success routines are amusing and pure genius.

There is a small amount of flicker in certain positions and, with a few sprite encounters, but considering the detail of the background and the characters this could have been much worse.



Sound is cleverly used and adds to the game with some recognisable snatches of tunes and the occasional squelch or crunch.

Control is a simple matter of left, right and jump and there are eight screens to complete per game. Each screen must also be completed in a limited time and you have the usual three lives. All in all, this is the kind of game which gives a good name to budget programs.



Johnny Reb II

Lothlorien
£9.95

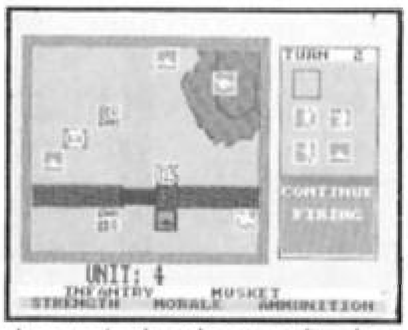
This is an American Civil war simulation that is both easy to play and offers a lot of variation even though it is concerned with only a small scale skirmish.

It's a one or two player game that centres on a strategically important bridge. You can opt to control the superior Confederate forces trying to capture the bridge or take the smaller Union force desperately trying to defend it.

Although by the standard of some war games the overall map is quite small, the emphasis in this game is in the effective marshalling of your forces and the scenario offers more than enough opportunity to show your leadership skills or alternatively show up the lack of them.

A major feature that makes this a wargame you will want to play again and again is that the basics of the game can be changed from the start of a new campaign. Landscape features such as houses, fences and walls can be placed anywhere you want them and the type and number of your forces can be altered. The units you

GAMES

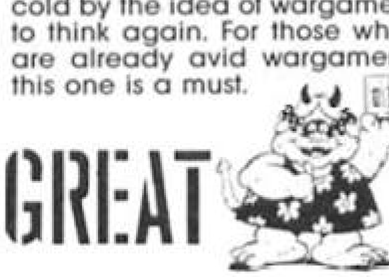


choose to lead can also be changed according to the strength, weapons and experience you require.

There are three levels, Level one gives you a 30 turn game and has "invisible enemy units" when you play a one player game, that is, you can only see the opposing forces when they come into viewing range. Levels 2 and 3 take 35 and 40 turns respectively.

Giving orders to your units is easy using a cursor and icon arrangement that allows you options such as advance, dig in, charge or fire. As you are furiously running around the battlefield with your cursor you can watch the progress of your units. Retreating units of infantry will not respond to cursor control, the message "Broken — cannot rally" flashes up. In time however morale may be raised and they can be thrown back into the fray. The simple command system makes Johnny Reb II a joy to play and the very vivid graphics allow you to keep a tab on exactly what is happening.

Johnny Reb II is the sort of game that may persuade those who up till now have been left cold by the idea of wargames to think again. For those who are already avid wargamers this one is a must.



Headcoach

Addictive Games
£8.95

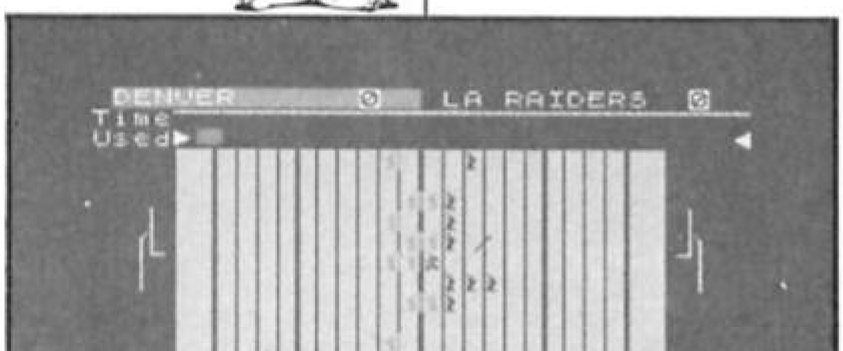
A superb game from the company famous for and in the same style as their Football Manager game.

The objective is to win the superbowl. To do this you must first win enough games in the twelve-week season to earn a place in the playoffs and then to fight your way through the first round to the conference championship and finally the Superbowl.

The game starts with you entering your team division number and then selecting your team. You then play a match in a style similar to Football Manager. Although the graphics are two dimensional you have real control over your players unlike other football manager type games, making it not only a game of stategy but also a game of skill.

After I lost the first game that I played I was shown the week's playoff scores of all the other teams. Occasional news bulletins gave me efficiency ratings of my team. Team managers sometimes contacted me and made various offers and contracts to buy, sell, or swop my players. The number of options, detailed instructions and sheer fascination of planning for success makes it a game that I would recommend to anyone, even if they did not know about American Football. I particularly liked the instructions which are both informative and educational. The game is well worth the money, and is a great introduction to this type of strategy and simulation game.





Video Poker

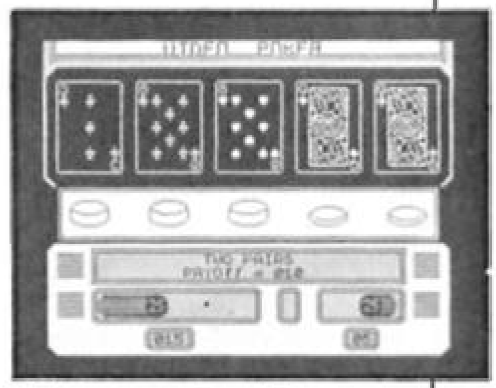
Mastertronic
£1.99

What you think of this game will depend very much on your attitude towards playing solitary card games. Personally, I've always felt that playing card games (or board games) on a computer was a poor second to playing against a 'real' opponent. This is especially true of a game like poker where the element of bluff is such an important part of the game.

The presentation of the game is quite slick; the screen display is a replica of the video poker arcade machine, with the five cards in the top half of the screen and the 'hold' buttons, betting information and your money displayed beneath that. The cards slide onto the screen from above, and there's quite a neat effect that gives the impression of the cards being turned over.

The inlay gives details of all the different types of winning hand and there's an onscreen table of betting odds that can be called up.

The weakness of the game is that you're really just playing on your own. All the computer does is to deal the cards and keep track of your money; there's no attempt to use the computer as any sort of 'intelligent' opponent, so you're reduced to just deciding which cards to hold on to. You can't



bluff your opponent because there's no opponent to bluff (there goes my Cool Hand Luke impersonation), and as you make your one and only bet before you see any of the cards you can't even risk losing your shirt on an inspired (or insane) series of 'raises' and 'calls'.

There are five skill levels provided, but the only effect they seem to have is to load the pack against you, which is an easy way around the need to provide a computerised opponent.

Visually this is one of the better implementations of a card game that I've seen on the Spectrum, but until someone can program the machine to play poker like Edward G. Robinson I'll stick to the real thing.



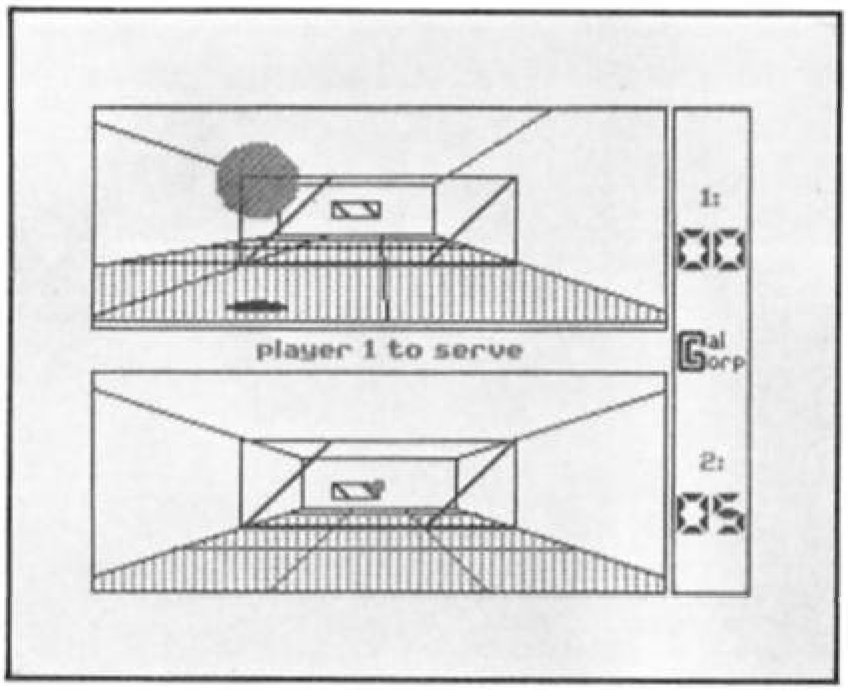
Room Ten

CRL
£7.95

This game, glowingly described on the inlay as being "the stunning game of the future" could more accurately be summed up as 'Pong revisited'. There's a sophisticated split screen display with 3-D graphics but even after a few moments on court it's apparent that the ghost of Pong has returned.

The aim of the game (you've guessed it) is to get your bat in the way of the oncoming ball and direct it back up court. Gone is the tiny oblong of yesteryear as now you've got a

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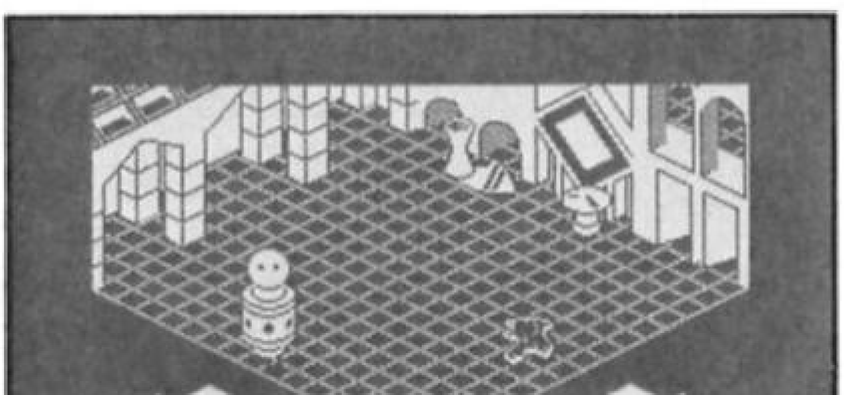


good sized bat which you can move around in space. One limitation is that you are stuck on the back wall and the main challenge of the game is adjusting to the angles of the ball as it bounces off the wall — if it gets past you your opponent scores five points and the first one to reach 35 wins.

There's an adequate variety of game options, with five speed settings and a computer opponent who can play on three levels of skill. Playing the computer is okay (it's very sluggish on the low setting and very Beckerlike at the top level) but this is the sort of game, like the original Pong, which is best played against a human opponent. Room Ten will definitely appeal to those who like instantly accessible competitive games, and as an update of Pong it suffices. It would have been nice though to have seen a few changes in the rules and gameplay to make it more interesting and the split screen, although necessary, gives the game a claustrophobic atmosphere that could become wearing after a few games.

If by any chance you missed out on the simple pleasures of Pong or want to rekindle memories in a 3D court you may want to sample Room Ten, but if you want something more than following the bouncing ball, go elsewhere.





Bombscare

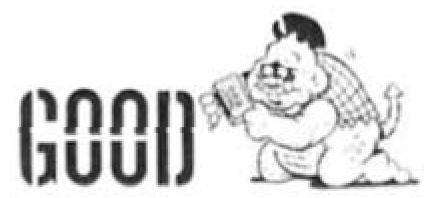
Firebird
£1.99

Just lately I've been dreading the arrival of each new game in the Firebird budget range because they've come up with some right duds recently, but with titles like Thrust and now Bombscare, Firebird can start to hold their head up again (though without getting too big headed, since Mastertronic are still out in front when it comes to budget games).

Bombscare is a sort of budget version of Alien 8, employing the Ultimate style of 3D graphics that just about everyone's using these days. You control a bomb disposal robot called ARNOLD in an attempt to defuse the time bomb planted on a space station in orbit around the planet Neptune. To do this you'll have to search the station for the tools and equipment that's needed, and work out how best to use all these things. Arnold can carry up to five objects at a time, and there's a teleport system that can be used to move around the station quickly (if you can work out the passwords required to activate it).

Along the way there are lots of 'absorbing devices' which pop out of thin air and drain ARNOLD's energy supply. You can survive several contacts with these before losing a life, at which point you turn into a pile of dust and get swept away with a brush. You can fire your own missiles at these devices in order to get them out of the way, though your supply is limited so it's best to get used to controlling ARNOLD's rotating style of movement in order to avoid collisions.

The main challenge in the game is exploration and locating objects, but as there isn't much in the way of obstacles or problem solving to deal with and to lend a bit of spice to the business of exploration, Bombscare is unlikely to offer the same challenge over a period of time that Alien 8 might. On the other hand, Bombscare only costs about a fifth of what Alien 8 would set you back, and it's still good enough to keep you occupied for a few evenings now that winter's on its way.





Football Manager

Addictive Games
£9.95

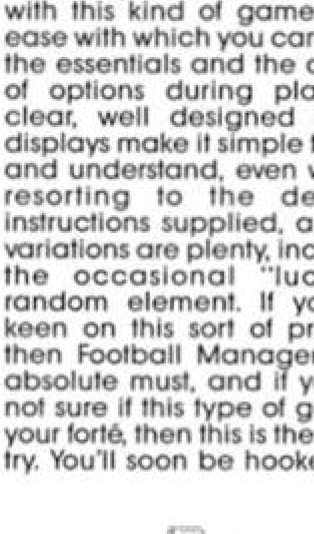
The evergreen Football Manager has been released for yet another season and it is as compelling as when it first hit the market many moons ago. There must be a version of this game for just about every micro on the market (and I can even remember a ZX81 version!).

The game is essentially a text game of strategy and planning, buying, selling, transferring and selecting players to get your team strength as high as possible in five areas, energy, morale, defence, midfield and attack before playing a match. Full league tables, promotion and relegation, FA Cup and the option to save or load a game is provided.

The graphic replay of match highlights is an effective way of adding tension to displaying the results, better than a simple pause and you can really get into it. I actually cheered or groaned as goals were scored for or against us.

This is the ultimate accolade, and this is probably one of the best strategy and simulation programs on the market, time has not aged it at all.

An important consideration with this kind of game is the ease with which you can grasp the essentials and the degree of options during play. The clear, well designed screen displays make it simple to read and understand, even without resorting to the detailed instructions supplied, and the variations are plenty, including the occasional "luck" or random element. If you are keen on this sort of program then Football Manager is an absolute must, and if you are not sure if this type of game is your forté, then this is the one to try. You'll soon be hooked.





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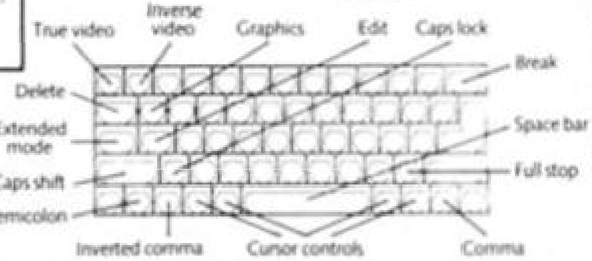
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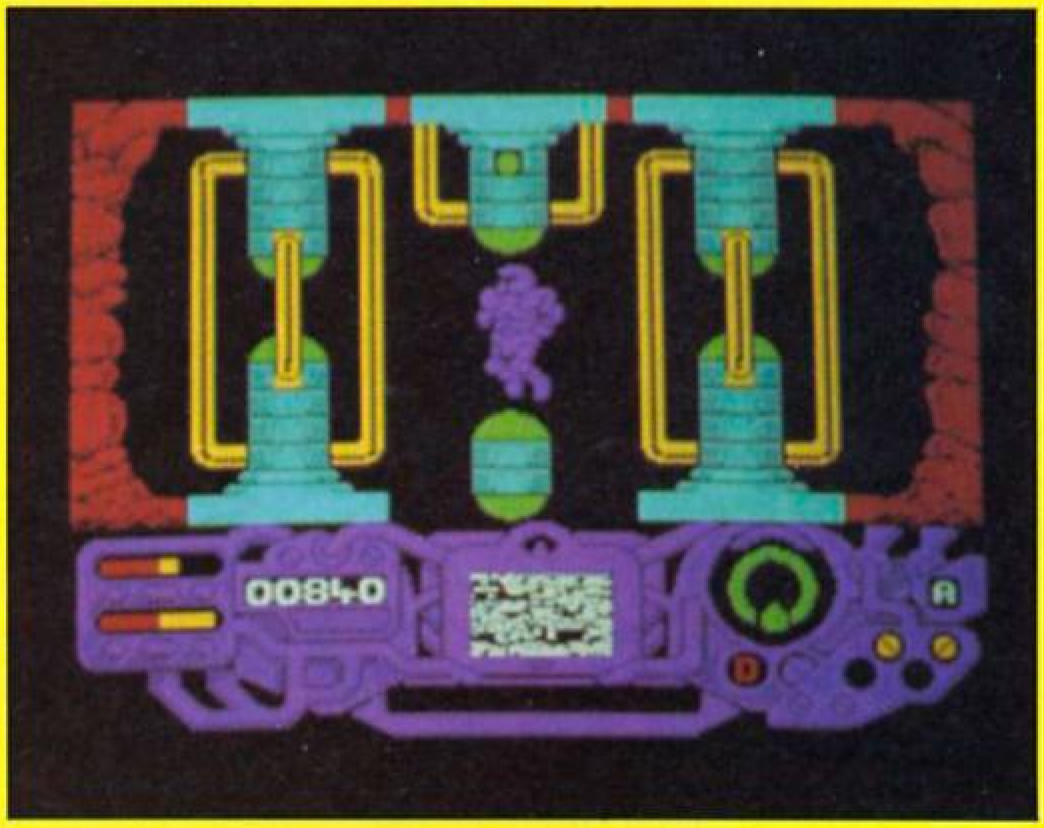
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Far off in the future the earth is transformed into an irradiated wasteland by nuclear war. Over the centuries a new race of primitive hunters emerged. They preferred a peaceful life but it did not last for long. Alien invaders conquered earth and put the tribe into slavery. The ruling aliens created a stronghold deep inside an extinct volcano. Powerless to fight the invaders' advanced weapons the tribesmen seem doomed but the elders recall the legend of "a sacred armour" that could enable a man to withstand the radiation levels of the volcano and destroy the aliens' citadel. Tal, the strongest warrior is selected by the elders to attempt this last ditch effort to save the people from slavery.



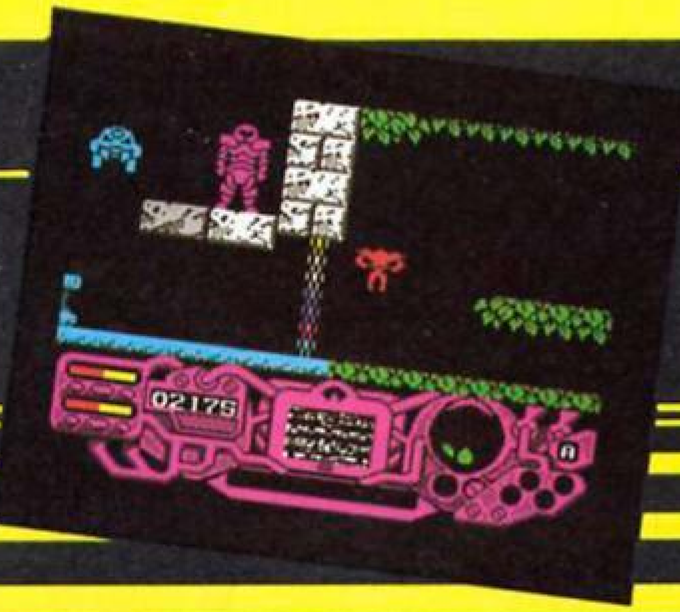
This scenario is brought to life by the inclusion of a 16 page comic book drawn by the game's designer Dan Malone. It makes a nice change from wading through grandiose prose that usually accompanies similar games and means that you have a clear idea of what you, as Tal, are out to accomplish.

The comic book also creates an atmosphere before you enter the game itself. This atmosphere is enhanced by the graphics which are among the most attractive and detailed to be seen on the Spectrum to date. Tal himself is a large figure, convincingly athletic and certainly not lacking in the jump department. His first objective is to locate the Anti-Rad suit and he can pick up an endless supply of rocks to help him knock out the nasties who stand in his way. The throwing action takes a bit of getting used to — that's because it's lifelike. Rocks are hurled not in a straight line but in an arc which makes pin point accuracy essential.

Among the early contenders to whittle down your lives are hanging slothes who are deadly if they grab you, flying insects with "delayed intelligence" (ie they will give you a few seconds before they home in on you) and acid rain droplets which are instantly lethal.

Once you have located the suit you can activate it simply by standing in front of it. Activating





the suit brings the display panel at the foot of the screen flickering into action. The panel includes indicators for armour energy levels and Tal's stamina, geiger counter, tactical message read out, and component indicator. This last indicator shows you are four components short of using the suit to accomplish the mission.

So you have to leave the security of the suit in order to find the 'grav boots'. This natty line in turbo charged footwear will enable you to get into the suit and get airborne. Although you can hover quite effectively in the suit in order to pick up essential objects such as a particle negator pulsar beam and the implosion mine to blow up the alien HQ, you need to get out of the suit again from time to time. This results in plenty of hazardous nipping in and out of the sacred armour. One problem to avoid is parking your suit on a level to which you can't return. To alleviate this problem there is a transporter concealed in the forest, which will return you to the suit wherever you have left it.

As you progress through the game the obstacles of course become more difficult. A particularly tricky sequence involves running the gauntlet through a series of firebreathing dragon statues. The flames look very convincing and of course take a toll on your energy. The radiation rises to deadly levels the nearer you get to your objective and it's a real race against time to plant the bomb before you succumb to the gamma rays. One moment of hesitancy, one false move and it's game over.

Antiriad is extremely pleasureable to play and the difficulty level has been pitched just about right. Palace's previous games Cauldron and Cauldron 2 certainly gave no quarter as far as difficulty is concerned and it may be that the appeals of stumped Cauldron players have persuaded Palace to make Antiriad just a shade easier. Most games players will however find that Antiriad is hard (but fair).

Overall Antiriad is an excellent package that has been presented with an expert eye for detail. The post holocaust scenario is hardly new to computer games but with Antiriad effective twists and touches have been added to make it stand above the crowd.



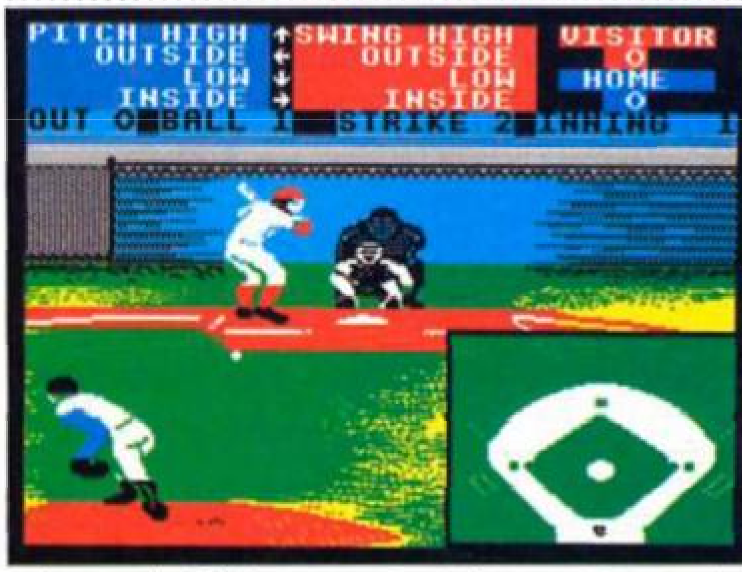




HARDBALL

Hard hitting action on the baseball diamond

HARDBALL
Advance Software
£8.95





With Channel 4 hoping to turn the nation into baseball fanatics by showing the World Series for the first time this is a timely release for those who want a taste of the simulated action.

Originally marketed on the Commodore 64 by US Gold, Hardball was considered too complex for conversion to the Spectrum and the rights passed to a new company, Advance Software, who have proved it could be done successfully.

Hardball can be played against the computer or as a two player game (keyboard v joystick) and Kempston, Interface II and Protek joysticks are supported. There are three screens and the first to confront you is the Manager's Decision Screen which allows you to choose a well balanced team. You can make changes and substitutions throughout the match too. Perhaps realising that baseball players who are legends in the States are unknown in Britain you can pick a team of colourful names such as Einstein, Lineker and Asimov.

Alternatively you can hold off from tinkering with the team and get straight on with the game. Pressing the Play Ball option transfers you to the pitcher/batter screen. A state of play display hangs over the batsman and both he and the pitcher are large, impressively animated figures. In the right hand bottom corner of the screen is a small map of the diamond which indicates how many batting players are on the bases.

Pitching offers plenty of variation. You select from no less than eight types of delivery, from the Fastball (straight and very fast) to the Slider (a curving ball that veers at the last moment). The actual target area you select is cleverly indicated by the backstop's moving glove.

Batting success relies entirely on timing and in general it seems that a good clout is made by hitting the ball a split second after you think you should.





Once a ball is hit the outfield screen comes up. This shows the diamond and outfielders. The batter has the option to get his players running round the bases while the fielder can move his receiving fielder (the one who is flashing on and off) to catch or retrieve the ball. He can then throw it to any of the bases and get a running batter out.

The flurry of activity as batter and fielder take appropriate action is exciting but unfortunately a lot of hits are set pieces, either being homers where the ball is knocked out of the ground or going straight to fielders for an easy catch. It's a small point but the game would have benefitted from a greater proportion of action dealing with fielding and running decisions.

Despite this Hardball offers sports simulation fans a whole new ballgame — it's addictive, well presented, contains a lot of variation and is an excellent two-player game. Playing against the computer is fun too. I lost the first series by an embarrassing margin but now I can give it a competitive game. The computer sometimes even takes pity on you and does something irrational like send a player on a run to a base with no chance of making it.

Overall Hardball can be highly recommended as good value entertainment and will undoubtedly convince a lot more people that Baseball is not just a game of rounders played on the other side of the Atlantic.

MONSTER HIT

STRIKE FORCE COBRA

Take your commando quartet on a gritty excursion to save the planet from nuclear devastation.

STRIKE FORCE COBRA
Piranha Software
£9.95

If this were a film instead of a computer game, it'd be one of those cheapo British adventure films like The Wild Geese (or Penguins, or something like that), in which a group of British character actors and a few minor international stars get together to form an elite fighting squad and carry out a desperate mission, against insuperable odds in some oddly named third world nation.

In this case the fighting force is known as Strike Force Cobra, and the mission involves penetrating the fortress headquarters of a man known only as The Enemy. Obviously gifted with a flair for the melodramatic, The Enemy is threatening the world with nuclear blackmail and only the Cobra team can stop him. By locating the captured scientists who have the codes to the central computer room, the team can then get to the computer and destroy both it and The Enemy's plans.

Like a cheapo adventure film, the game begins with a sequence where the team members are recruited. You have a choice of eight possible characters, out of which you have to assemble a team of four. I chose Kawalski, McWatt, Dawson and Stern, who in the film would be played by Ernest Borgnine (gruff marine with a heart of gold), Richard Burton (the leader — cool, unflappable, with some tragic secret in his past), Richard Harris (total alcoholic, but the best explosives man around), and some European sex kitten or other (French resistance — beautiful but hard as nails).

The four team members split up and enter the fortress at different points, gradually regrouping as they round up the captives and fight their way down through the fortress's four levels. You control one character at a time and have to co-ordinate their movements. There are a number of lifts and doorways which are controlled from points elsewhere in the complex, so you'll have to do a bit of mapping and work out how best to move the team so that they can help each other get past these obstacles.

The rooms and corridors of the fortress are heavily defended by electronic traps, automatic rifles, armed soldiers and various other devices of the sort which pad out the middle half hour of adventure films. There's a lot of leaping through windows, kicking down doors, hurling grenades and spraying everything in sight with machine gun fire. All this is well presented graphically and the animation is very good — a bit like a 3D version of Impossible Mission — although it does tend to slow down dramatically if there's a lot of movement on screen.

The instructions could be a little clearer on some points, such as how to activate the lift and door switches, but if you stick with it you should soon see what you're trying to do. The game is a combination of arcade action (in the combat side of things), and strategy (in avoiding the traps and working your way through the fortress), and although these two parts of the game are well balanced, and the game is well presented, the pace of the game lets it down a bit. Even though you are working against a time limit there's not that much sense of urgency about the game play (what we need is a few close-ups of Richard Burton glancing at his watch and saying "Kawalski's late, damn him!").

Even so, Strike Force Cobra is still worth having a look at. It does have its moments, even if it doesn't quite achieve its full potential, and along with Trap Door is helping the new Piranha label to get off to a good start.







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Scroll your own

By LEIF KVERNHUSVIK

A short m/c routine that can be used in your own programs.

Here's a short machine code routine which uses the Spectrum's DEF FN facility to allow you to scroll text across any line of the screen, in any colour, and in a variety of character widths. Although you can scroll text using different character widths, the best results are obtained using the lower two lines of the screen, because of the way that the screen display is mapped in memory.

Listing 1 is a BASIC loader program, containing all the machine code in DATA statements, while listing 2 is a short program demonstrating how to use the routine. In listing 2, line 10 sets up the width, colours and line number for the text, line 20 defines the actual text itself, and line 30 starts the scrolling routine.

For the smartypants amongst you, listing 3 is the assembler listing which gives full details of the machine code routine. Normally, the routine, once started, can be interrupted by pressing a key, but the following POKES have different effects:

POKE 23421,201 — the program returns to BASIC when a key is pressed or when the text has finished scrolling.

POKE 23414,0:POKE 23421,201 — the program cannot be interrupted, and only returns to BASIC when it has finished.

POKE 23414,192:23421,195 — the program will only return to BASIC when a key has been pressed.

Listing 1. Basic loader

```
 10 FOR a=23296 TO 23446 STEP 10
 20 LET s=0: FOR b=0 TO 9
 30 READ c: POKE a+b,c
 40 LET s=s+c: NEXT b
 50 READ d: IF s<>d THEN PRINT "Error in line ";a-23196: STOP
 60 NEXT a: PRINT "OK": STOP
 70 SAVE "Textmc"CODE 23296,159
 80 STOP
 90 :
100 DATA 221,42,11,92,221,78,13,6,0,205,889
110 DATA 128,91,221,126,29,6,32,119,35,16,803
120 DATA 252,221,78,13,6,31,205,144,91,34,1075
130 DATA 159,91,221,110,4,221,102,5,221,78,1212
140 DATA 6,221,70,7,197,229,126,111,38,0,1005
150 DATA 41,41,41,237,91,54,92,25,17,161,800
160 DATA 91,1,8,0,237,176,6,8,197,42,766
170 DATA 159,91,17,161,91,6,8,197,229,26,985
180 DATA 23,18,221,70,21,245,197,229,6,32,1062
190 DATA 203,22,43,16,251,225,193,241,16,241,1451
200 DATA 225,193,36,19,16,227,118,193,16,214,1257
210 DATA 205,142,2,225,193,123,254,255,192,35,1626
220 DATA 11,120,177,32,175,195,0,91,121,15,937
230 DATA 15,15,79,230,224,168,111,121,230,3,1196
240 DATA 238,88,103,201,121,15,15,15,230,224,1250
250 DATA 168,111,121,230,24,238,64,103,201,0,1260
```

Listing 2. Demo program

```
10 DEF FN x(a$,l,w,a)=USR 23296
20 LET t$="Whatever you want to see printed.                   "
30 LET text=FN x(t$,23,2,112)
40 STOP
50 REM a$=string
60 REM l=line (0-23)
70 REM w=width (1-4)
80 REM a=attribute (0-255)
```

Listing 3. Assembler listing

```
5B00           0010        ORG  23296
5B00 DD2A0B5C  0020 START  LD   IX,(23563)
5B04 DD4E0D    0030        LD   C,(IX+13)
5B07 0600      0040        LD   B,0
5B09 CD805B    0050        CALL CALCA
5B0C DD7E1D    0060        LD   A,(IX+29)
5B0F 0620      0070        LD   B,32
5B11 77        0080 LOOP1  LD   (HL),A
5B12 23        0090        INC  HL
5B13 10FC      0100        DJNZ LOOP1
5B15 DD4E0D    0110        LD   C,(IX+13)
5B18 061F      0120        LD   B,31
5B1A CD905B    0130        CALL CALCL
5B1D 229F5B    0140        LD   (LINEF),HL
5B20 DD6E04    0150        LD   L,(IX+4)
5B23 DD6605    0160        LD   H,(IX+5)
5B26 DD4E06    0170        LD   C,(IX+6)
5B29 DD4607    0180        LD   B,(IX+7)
5B2C C5        0190 TEXT   PUSH BC
5B2D E5        0200        PUSH HL
5B2E 7E        0210        LD   A,(HL)
5B2F 6F        0220        LD   L,A
5B30 2600      0230        LD   H,0
5B32 29        0240        ADD  HL,HL
5B33 29        0250        ADD  HL,HL
5B34 29        0260        ADD  HL,HL
5B35 ED5B365C  0270        LD   DE,(23606)
5B39 19        0280        ADD  HL,DE
5B3A 11A15B    0290        LD   DE,SHIFT
5B3D 010800    0300        LD   BC,8
5B40 EDB0      0310        LDIR
5B42 0608      0320        LD   B,8
5B44 C5        0330 SCROL  PUSH BC
5B45 2A9F5B    0340        LD   HL,(LINEF)
5B48 11A15B    0350        LD   DE,SHIFT
5B4B 0608      0360        LD   B,8
5B4D C5        0370 LINE   PUSH BC
5B4E E5        0380        PUSH HL
5B4F 1A        0390        LD   A,(DE)
5B50 17        0400        RLA
5B51 12        0410        LD   (DE),A
5B52 DD4615    0420        LD   B,(IX+21)
5B55 F5        0430 WIDTH  PUSH AF
5B56 C5        0440        PUSH BC
5B57 E5        0450        PUSH HL
5B58 0620      0460        LD   B,32
5B5A CB16      0470 ROW    RL   (HL)
5B5C 2B        0480        DEC  HL
5B5D 10FB      0490        DJNZ ROW
5B5F E1        0500        POP  HL
5B60 C1        0510        POP  BC
5B61 F1        0520        POP  AF
5B62 10F1      0530        DJNZ WIDTH
5B64 E1        0540        POP  HL
5B65 C1        0550        POP  BC
5B66 24        0560        INC  H
5B67 13        0570        INC  DE
5B68 10E3      0580        DJNZ LINE
5B6A 76        0590        HALT
5B6B C1        0600        POP  BC
5B6C 10D6      0610        DJNZ SCROL
5B6E CD8E02    0620        CALL 654
5B71 E1        0630        POP  HL
5B72 C1        0640        POP  BC
5B73 7B        0650        LD   A,E
5B74 FEFF      0660        CP   255
5B76 C0        0670        RET  NZ
5B77 23        0680        INC  HL
5B78 0B        0690        DEC  BC
5B79 78        0700        LD   A,B
5B7A B1        0710        OR   C
5B7B 20AF      0720        JR   NZ,TEXT
5B7D C3005B    0730        JP   START
5B80 79        0740 CALCA  LD   A,C
5B81 0F        0750        RRCA
5B82 0F        0760        RRCA
5B83 0F        0770        RRCA
5B84 4F        0780        LD   C,A
5B85 E6E0      0790        AND  224
5B87 A8        0800        XOR  B
5B88 6F        0810        LD   L,A
5B89 79        0820        LD   A,C
5B8A E603      0830        AND  3
5B8C EE58      0840        XOR  88
5B8E 67        0850        LD   H,A
5B8F C9        0860        RET
5B90 79        0870 CALCL  LD   A,C
5B91 0F        0880        RRCA
5B92 0F        0890        RRCA
5B93 0F        0900        RRCA
5B94 E6E0      0910        AND  224
5B96 A8        0920        XOR  B
5B97 6F        0930        LD   L,A
5B98 79        0940        LD   A,C
5B99 E618      0950        AND  24
5B9B EE40      0960        XOR  64
5B9D 67        0970        LD   H,A
5B9E C9        0980        RET
5B9F 0000      0990 LINEF  DEFW 0
0008           1000 SHIFT  DEFS 8
               1010        END

SHIFT 5BA1   LINEF 5B9F   CALCL 5B90
CALCA 5B80   ROW   5B5A   WIDTH 5B55
LINE  5B4D   SCROL 5B44   TEXT  5B2C
LOOP1 5B11   START 5B00   =     5DD8
```

DRUID

Firebird don their habits for a bit of mystical mayhem.

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Firebird
£7.95



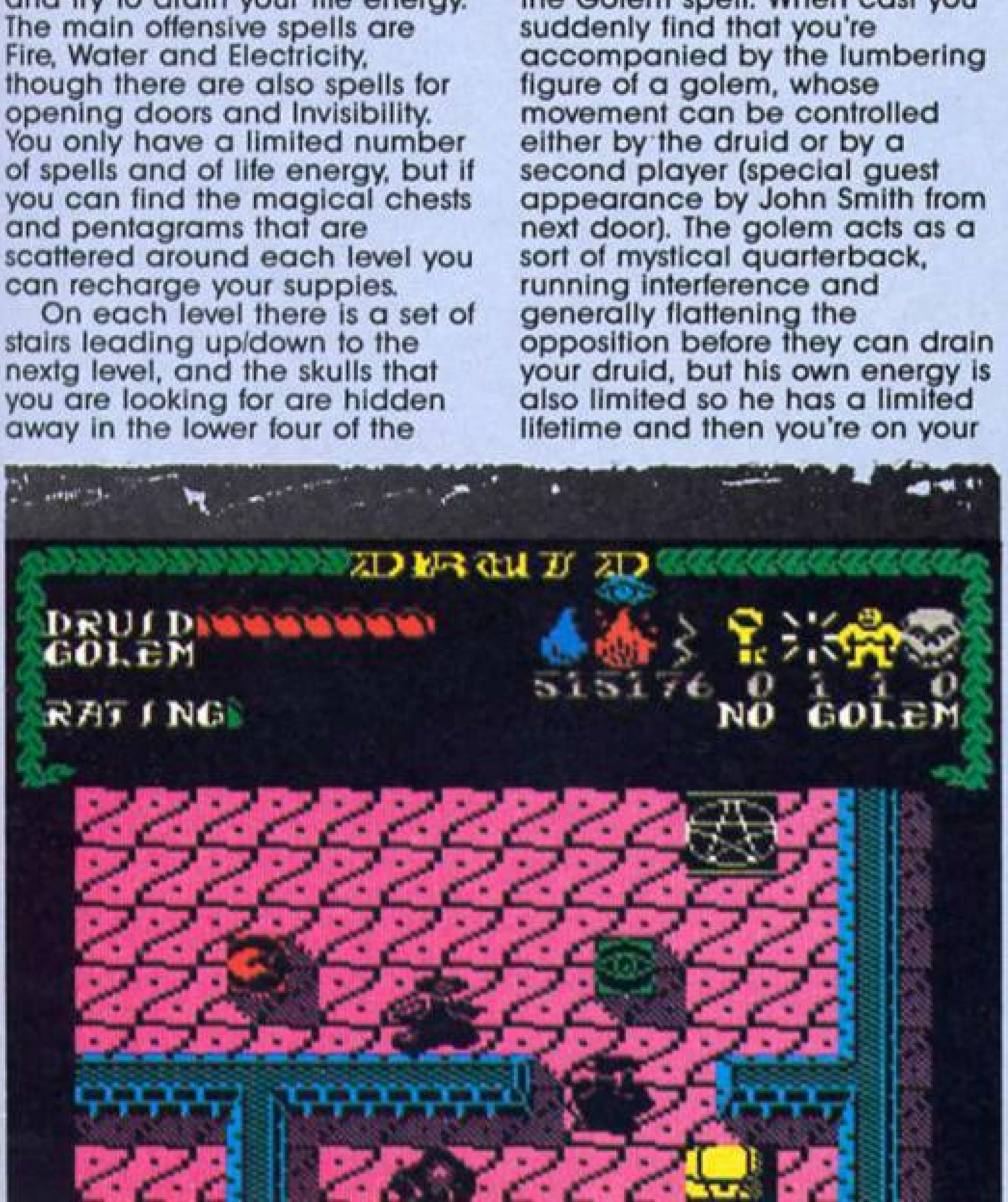
I'm told by those in the habit of frequenting such places that Druid is based on that arcade game of the moment, Gauntlet (though the official version of Gauntlet is being produced by US Gold). I've not played Gauntlet myself, but I did find Druid enjoyable, if a little frustrating.

In the game you control the figure of a plump little Druid (who obviously spends too much time lying around between solstices) who has been saddled with the task of destroying four skulls, created by the Princes of Darkness and hidden in the depths of a dismal tower. The tower is guarded, as towers tend to be, by all manner of ghosts and water beetles (?).

Your druid has a number of spells at his command, and different spells are effective against each of the monsters that will come at you in hordes and try to drain your life energy. The main offensive spells are Fire, Water and Electricity, though there are also spells for opening doors and Invisibility. You only have a limited number of spells and of life energy, but if you can find the magical chests and pentagrams that are scattered around each level you can recharge your suppies.

On each level there is a set of stairs leading up/down to the nextg level, and the skulls that you are looking for are hidden away in the lower four of the tower's eight levels, so you've got a lot of monster-blasting in store.

One of the more interesting spells that you can call upon is the Golem spell. When cast you suddenly find that you're accompanied by the lumbering figure of a golem, whose movement can be controlled either by the druid or by a second player (special guest appearance by John Smith from next door). The golem acts as a sort of mystical quarterback, running interference and generally flattening the opposition before they can drain your druid, but his own energy is also limited so he has a limited lifetime and then you're on your own again.



You are given an overhead view of each level, and the screen switches rapidly from section to section of the maze as you move around. Being set in a maze, it's the kind of game that lends itself to large block-graphics and these have been done quite well, though they're not particularly spectacular.

The animation is smooth, despite the rather lumpy sprites, which is important because the game is basically a fast-reflex shoot 'em up. There is some element of judgement involved in your choice of spells and the use you make of the golem, but underneath the druid's habit lurks a mediaeval commando, despatching ghosts and ghoulies with all the gusto of a Rambo.

It's quite good fun, and the exploration of the levels in search of spells and skulls adds a bit of variety to the mystical mayhem. I found that the druid's lifeforce tended to get drained a bit too quickly, leading to a lot of not terribly long games, but though it's reasonably addictive I shan't be rushing to the arcades to join the rest of the Gauntleters.

FAT WORM

blows a sparky

Now for something completely different. You are an insidious little WORMIE being chased through a micro-electronic labyrinth (you guessed it — a Sinclair Spectrum!) by CREEPERS in SPUTNIKS and CRAWLERS on foot (feets?). Defend yourself by shooting BURPER SPARKIES at the CRAWLERS, and BLASTER SPARKIES to take-out the SPUTNIKS. You'll see the computer board in a smooth-scrolling 3D viewed from above (yawn, yawn — just another bit of mega-programming), as you crawl around in search of a DISK DRIVE on which to CLONE yourself. First you'll need to find fifty SPINDLES to eat, which will replenish your supply of SPARKIES to shoot at the BUGS. How long can you crawl down a DATA BUS? Find out how refreshing a DE-BUGGER feels when you're stuck in a Spectrum and covered in CRAWLIES. This game is like: WELL CRUCIAL MAN

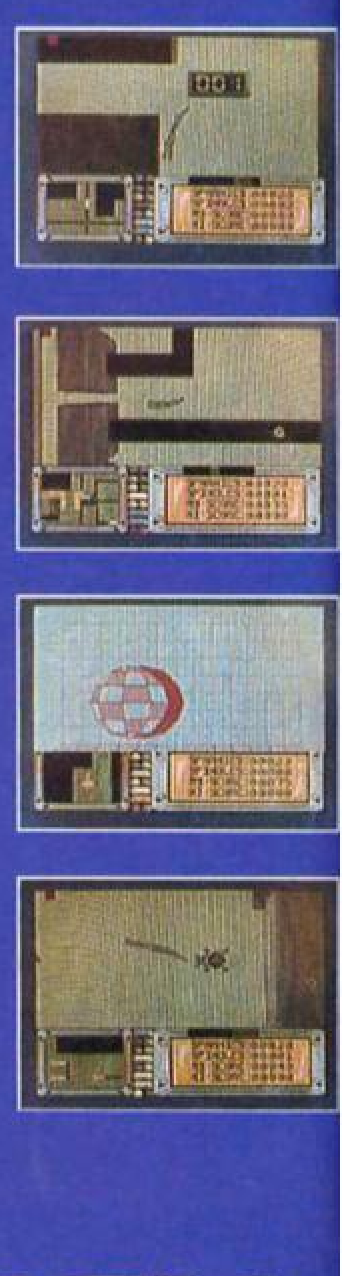
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Gargoyle Games' new arcade label gets off to a flying start with Light Force.

Light Force
FTL
£7.95

It took me about thirty seconds to become addicted to Light Force and my joystick and trigger finger haven't been the same since.

Light Force is the first game to be released on Gargoyle's new Faster Than Light arcade label, and the first to feature their new 'Lasermation' graphics techniques. The game itself is very simple; it's a straightforward 'blast everything in sight' shoot-'em-up, along the lines of Galaxians but with a few added touches.

You control the Light Force fighter craft, the sole space ship in the vicinity of the human colonies in the Regulus system which has just been overrun by a vast alien force. Each planet is defended by waves of enemy spacecraft, and, in true shoot-'em-up tradition, you've got to avoid their attacks and blast them all out of the sky if you can. In addition, there are numbers of control centres based on both the surface of each planet and on spacestations in the asteroid-cluttered void between each planet. If you can destroy enough of these control centres you gain extra lives, so obviously their destruction becomes your main aim. The tricky bit is in concentrating your fire on these centres at the same time as dodging asteroids and enemy craft and also trying to destroy as many of these as you can in order to rack up a high score (it took two days before I finally managed to creep onto the hi-score table at no. 14).

Some of the attack waves are really vicious, coming at you in different formations, swooping across the screen, dropping bombs and generally giving your trigger finger a hard time. It's this multiplicity of targets that makes Light Force so addictive. It's not enough just to stay alive and zap a few spaceships, you've got to coordinate your attack so that you can handle the waves of attacking aliens at the same time as trying to get the control centres. To make things harder the control centres require about three direct hits before they're totally destroyed, and the whole thing results in me frantically pounding away at the joystick's 'fire' button, rocking madly from side to side as I try to zoom all over the screen without losing my sweaty grip on the joystick. It's that kind of game.

Lasermation

The graphics in Light Force have been programmed using Gargoyle's new Lasermotion technique which, miracle of miracles, actually seems to get around the Spectrum's attribute problems. The result is a fast paced game with lots of large, colourful, and smoothly animated sprites. It *does* make a difference to the game to have the improved use of colour that Lasermation makes possible, and it also gives the sprites a more solid chunky look that's quite nice.

My only minor niggle about the game is that you have to shoot most of the asteroids and spacecraft absolutely dead centre in order to destroy them, so that quite often when it looks like you've scored a hit you can still get pulverised by an asteroid that refuses to blow up and go away. And of course the asteroids and alien craft only have to strike a glancing blow to settle you hash and get rid of one of your lives. But that doesn't stop Light Force from being the most addictive shoot'em-up I've played in months.

MONSTER HIT



With Amstrad now in charge, will Sinclair machines finally break into the american market? Mark Fendrick gives us the view from the U.S.

As we end 1986, we take a quick look back and then a peek at what the future may bring to Sinclair users here in the States.

Of course the big story this year which affected all Sinclair users everywhere was the sale of Sinclair Research Limited's computer business to Amstrad Consumer Electronics. Right on the heels of this announcement came a similar blockbuster of a move for us here — the purchase of Sinclair's U.S. inventory by A+ Computer Response. Truly mixed signals for the American Sinclair user, encouraging all at the same time. A+ was going to market the QL as Sinclair (and Timex) had never marketed its products in the past, promised to fully support its newly established network of authorized dealers and investigate a return to production of the U.S. model QL.

For a long time the QL remained at the $295.00 level which had been established by Sinclair (after introducing the QL at $499.95), but as this issue goes to press, dealers are reducing the cost of a complete QL (including the 4 Psion application programs and User's Manual) to $209.00! This is in response to the release of a QL kit by A+ Computer Response for $135.00! This is a simple to assemble kit, but does not come with the software or manual. Kits are available from authorized QL dealers.

But how did the Amstrad buy out actually affect us here in the United States? Not very much actually. In fact, the Amstrad name is probably less familiar to Americans than the hardly known (sorry guys) Sinclair nameplate. Amstrad may have been the second largest in the British home computer market, but was, and is, virtually unheard of here. An early attempt at a Z80 based computer (the CPC 464) fizzled without anybody even knowing it existed. I myself must confess that the only reason I had ever heard of the company was because I regularly read ZX Computing and saw mention of the brand in software ads.

No reply

Amstrad's current "secret" in North America is its Personal Word Processor. It is marketed by Sears World Trade Inc., a division of Sears, the largest North American department store. So it has been carried in Sears stores both in the United States and Canada. Sears World Trade planned on marketing it in department stores, large computer related electronics stores and selected Sears stores.

The Amstrad Personal Word Processor is the middle ground between an electric typewriter and a personal computer. Selling for a list price of $799.00, it consists of a keyboard, monitor, printer and word processing program. Utilizing 3 inch drives, with CP/M available it is in fact a true personal computer although Amstrad is not promoting it as such. Those of you with good memories will immediately associate this description with Coleco's ill-fated Adam. The main difference is attention to detail. Coleco attempted to attract both the games playing customer as well as the student interested in a word processing system. The Adam, originally targeted at the same price as the Amstrad system, looked like a toy while the Amstrad looks like a professional set-up. While Adam opted for a very unreliable tape storage system, Amstrad has gone with the up and coming 3-inch disk drive. Although the supply of these disks is still somewhat unreliable and expensive, the fact that more and more systems are being built around this format will alleviate both of these factors.

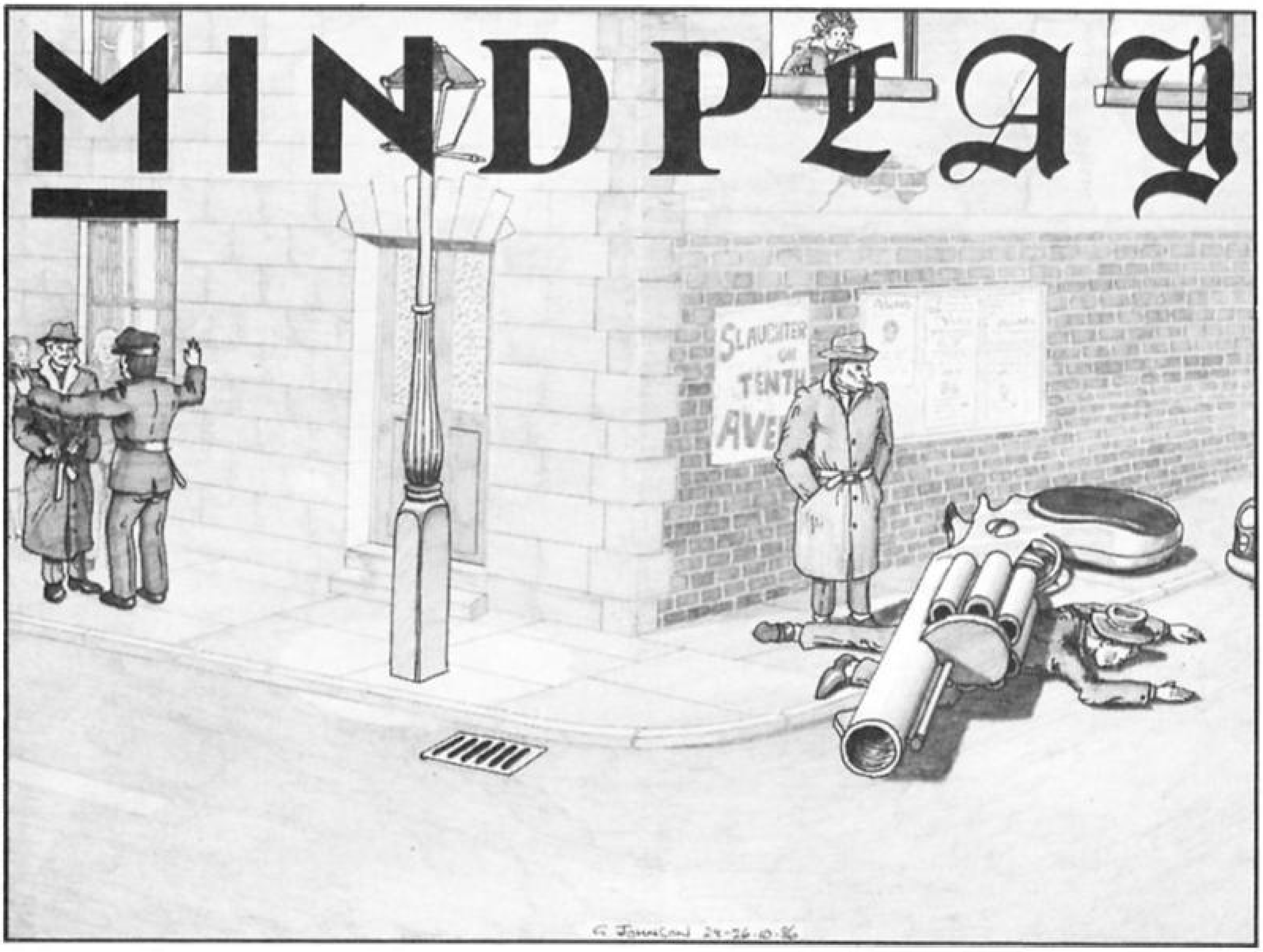
But the marriage between Amstad and Sears World Trade has not been what either side had expected. So far the company who has emerged as the largest supplier of home computers in Europe has produced a very disappointing showing in North America. Based upon the successful penetration of Amstrad into the British market, it was expected that Sears World Trade would purchase 100,000 units. So far the actual number is closer to only 70,000 systems.

Whither the Plus 2?

But what about Amstrad's newly acquired Sinclair line of computers? Will we be seeing the new versions of our favourite computer finally showing up on the counters of U.S. computer shops? Don't count on it.

Although Amstrad has now released its first new computer under the Sinclair banner, we do not expect to see it introduced in the U.S. now or in the future. First of all, any computer going onto the market in the U.S. would have to meet some very strict standards as set forth by the Federal Communications Commission (FCC). Not only would Amstrad have to make some modifications to meet these standards (as well as adapt for the North American power system and NTSC broadcast standard), but those seeking FCC certification must pay for those tests as well. No doubt Amstrad would proceed along that course if there was a market for Sinclair computers, but it just does not exist in the numbers to justify the time and expense. It is the general consensus that Amstrad will simply concentrate the Sinclair name in the markets where it is already a force and not try to create one where it does not exist.

As for Amstrad's future in this country, it is yet to be seen, but as of today it is an uphill climb. Perhaps the introduction of Amstrad's new line of IBM compatible computers will start that climb. Hoping to bring these computers to the American market sometime in 1987, they will represent an inexpensive alternative to the current crop of IBM compatibles. They are being introduced in Britain with a price range starting at $594.00 and topping off at $1,190.00. To sell in America you need to be IBM compatible, and at those prices Amstrad may finally make its name known here.



The winter chill has really set in now, and the dungeon is deathly cold as well as damp and depressing. My only heat is from the battered Spectrum powerpack that I use for my work. Does your heart not bleed for me? Oh alright, be like that then.

Winter of the nuclear kind is a distinct possibility if you don't solve the latest Interceptor game, Aftershock, reviewed this month. Some people have expressed doubts about the tastefulness of releasing a game about nuclear reactors post-Chernobyl: but to be honest, the game deals with the after effects of an earthquake rather than a nuclear explosion. Also this month, I don my trilby and raincoat to investigate The Vera Cruz Affair.

A number of helpline requests arrived recently for a game I'd never played, Sinbad and The Golden Ship from Mastertronic. This was not reviewed by anyone when it was released — earlier in the year I think — and I don't know why, because having actually bought a copy, it turns out to be pretty good. Based on the various Sinbad tales and legends, it's split screen, not Quilled, and written by Roy Carnell (remember The Black Crystal all those years back?). An entertaining theme that has been well used. The graphics and text are variable, some effective, some below average, but generally acceptable. Input is sluggish, but generally this is an enjoyable game and well worth £2. I'd give a "Great" rating if this was a full review.

Nice to see a few good cheapo games coming through, but I'm still waiting for something really stunning in the lower price ranges. And I hope to see some more full-price releases in the run-up to Christmas: only two mainstream adventures came in for review this month. Still, promised products — such as Domark's James Bond adventure, Live and Let Die, and Delta 4's adaptation of the comedy book The Colour of Magic — will hopefully arrive in time to fill any stockings, as should Dodgy Geezers, the comedy crime caper from Melbourne House, written by Lever and Jones, the authors of Hampstead and Terrormolinos. All that has materialised of this so far, however, is the "song" that will be given away on the cassette flip-side. This, sadly, is boring; it makes no attempt to be lyrically funny, and while musically appalling is not inept enough to be funny. A waste of time and effort, but I have higher hopes for the game. Whatever happened to giveaway songs that were worth listening to, like Pimania? All together now: "Go easy with the rubber duck/Make the most of your pork pie. . ."

What do you mean, you can't remember that far back? Huh, on with the reviews!

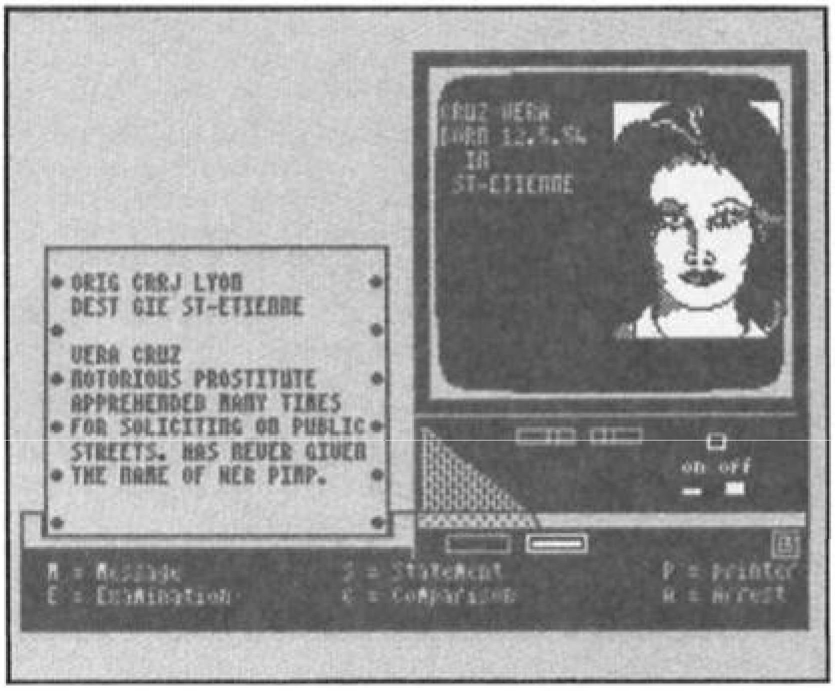
L'AFFAIRE VERA CRUZ

Infogrames
£8.95

You play what Inspector Clouseau would call an Officer of de Luuure, dans un jeu francais. Oui, following US Gold's import success, French software house Infogrames are trying to break the UK market.

Title star Vera is less than forthcoming when you first meet her, not least because she is dead, and slumped messily across the floor of her apartment. Is it a simple case of suicide, as the note on her table would have you believe? Presumably not, or the game would be somewhat pointless. As newly appointed head of the St. Etienne Crime Squad, you must find the truth.

The game is in two parts. In the first, an excellent graphical representation of the scene of the crime is portrayed, complete with central corpse. By moving a "viewfinder" window with the ability to give close ups of certain objects, you must col-





lect the evidence. Vital information such as the type of pistol used is gained here.

Part two, which sees you back at central office and again has superb graphics, resembles The Fourth Protocol, with use of single key commands and computer instructions. As well as the traditional methods of taking statements and conducting examinations such as autopsises, you have the French police computer system at your disposal, which can be used to obtain information on suspects, registration numbers and the like. You can also contact police forces elsewhere, who may have further details on leads you are following.

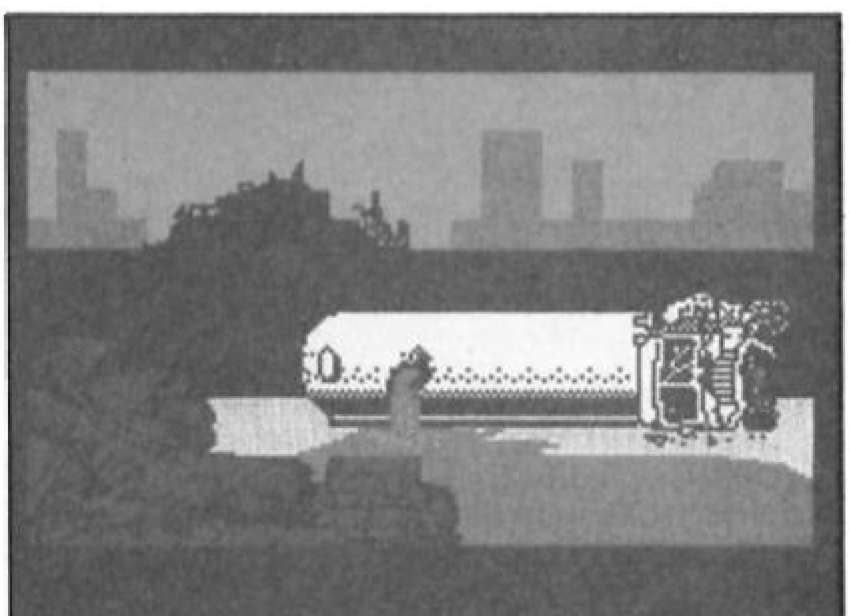
As you delve deeper into the investigation, increasingly sordid details emerge. Vera was a lady of the street; and, considering the needle marks on her left arm and the presence of the name of a drug smuggler in her diary, narcotics seem to be involved too. A real sense of deduction is created, each new, hard-gained fact spurring you on.

The translation of the game is in no way stilted, and the French atmosphere it retains is entertainingly unusual. Some of the messages from the computer, however, contain confusing French abbreviations and place names. It can be hard to tell whether something is a police code, a French district code, telephone number...

This is precisely the sort of thing that the instructions should deal with. The aforementioned Fourth Protocol had an excellent glossary booklet of technical police terms, as well as a game manual. Vera Cruz's only tells you the bare necessities, and this is the game's major flaw. Not enough examples of what you can do are given, while the computer system is extremely unfriendly. So when something meets with a negative response, you are unsure whether you are trying something the computer cannot do, trying something the computer can do but using the wrong words, or just on the wrong track with an idea. The unhelpful, standard game messages make life still worse. As a result, Vera Cruz is at times infuriatingly difficult, and progress slow.

Apart from this, it is innovative, feels authentic and is enjoyable. Infogrames planned future releases sound very interesting, but documentation really must be improved. As it stands, this game requires great patience and perseverance: if you have this, you will be rewarded.





AFTERSHOCK

Interceptor
£9.99

Interceptor have been quiet for over a year now, not counting the launch of their Players budget label. Aftershock sees the return of their familiar adventure author, David Banner, and artist, Terry Greer, who together created such minor classics as Forest At The World's End.

The scenario is reasonably original. Ground tremors alert a city, built on a geological fault, that an earthquake is imminent. Just as the city's population has been evacuated, the massive quake hits. This completely disables the already fragile cooling system of the local nuclear reactor, so it begins to overheat. You — a nuclear scientist, no less — must stop it doing so.

The game starts in your office, atop a blazing skyscraper. If you can escape — the stairwell is destroyed by fire and the lift inoperative — you face a virtually deserted, demolished city. The tube station is flooded, the zoo runs wild, looters and soldiers roam dangerously. The imaginary city becomes pleasingly realistic due to the minor details the author has put in, such as a statue at one point, and place names. Some buildings still stand and have to be investigated, including the long-deserted former home of a millionaire. Then there are the minor technical problems too, like how to defuse a reactor...

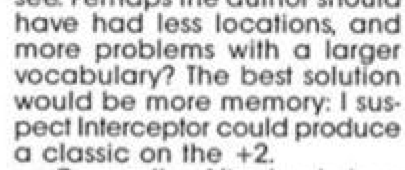
Much to my delight, David Banner has listened to the criticisms of his previous games, so making Aftershock his best yet. First thing you notice is the text. Previously there was hardly any, at best single sentences. He has now swung to the other extreme, with lengthy and evocative descriptions on a par with the best mainstream games around. If there is fault to be found, it is his tendency to go over the top.

The excellent text is complemented by Terry Greer's stunning graphics. His work is unsurpassed on the Spectrum, and whilst this is not his best ever, each picture is a joy to behold. Eagerness to see the next micro masterpiece adds incentive to play. They are not numerous however.

Sadly, there are faults. Partly, I would guess, because the text and graphics took up so much memory, the game has an extremely fussy vocabulary. However, not only is there lack of synomyns (no GET), you are required to enter ridiculously specific commands such as BRACE STAIRS WITH BEAM; it must be those exact words! Unnecessarily poor programming. Also, EXAMINE is generally unresponsive.

Another possible flaw: some adventurers will find this too easy, if they are able to think of the right word combinations. There's not that much to do, though there's a good deal to see. Perhaps the author should have had less locations, and more problems with a larger vocabulary? The best solution would be more memory: I suspect Interceptor could produce a classic on the +2.

Generally, Aftershock is a welcome improvement technically on previous Interceptor adventures; whilst being as fun to play as its predecessors. Nothing special though, and reduced one in rating for being £3 too expensive (at £10 it's competing with Level 9).



HELPLINE

Firebird's entertaining **Seabase Delta** has proved popular on the Helpline this month. M. Luscombe from Bournemouth is having difficulty travelling by tube. From the station, you must ENTER CAR, FASTEN BELT, INSERT CARD, UNFASTEN BELT, LEAVE CAR. A.W. Lewsley from the HMS Neptune wants to wake the hen. You need to CHEW the GUM then, when in the same room as the bird, BLOW BUBBLE. The soft, gooey gum is also used to STICK BUTTON in the lift, allowing you to reach the third level (which you need to do). This should help Daniel Weightman, who also asks how to keep the sliding doors open after shouting in the microphone. In fact, you need to play music into it, using the tape recorder. The cassette is north from the TV camera, which you must disable in culinary style.

Rick Bos from Ontario (yes, the one in Canada) cannot leave the ship in **Mindshadow**. If you meet any opposition when you try to go south inside, KILL MAN. TALK to the CAPTAIN, take the canvas from the boat, examine the winch then CUT CHAIN WITH CLEAVER. To finally escape, WALK PLANK and head east. Make sure you have the shell from the beach as you'll need it in part two.

G. Booth is also having nautical problems, in Mastertronic's **Sinbad and The Golden Ship**. How does he go from the vessel to the island? Well, having sailed east from the start until told you can go no further, DIVE off the side and SWIM EAST to shore. In the same game, Carolann Ablett from South Glamorgan is being prevented from crossing the drawbridge by a dragon. The solution is to HIT GONG WITH AXE then HIT CHAIN WITH AXE. The axe is useful throughout your voyages. Neil Talbott is stranded later in the game. In answer to his questions: to defeat the genie, HIT LAMP WITH — what a surprise — AXE. TIE ROPE (the one you should have found right at the start) to the snake's tongue and PULL ROPE to find a gem. UNTIE ROPE again, because you need it to LASSOO the white horse. Then you can RIDE and EXAMINE said creature.

The Boggit has caused many pleas to cascade through the grating this month. Karsten Grombach from West Germany, Anton Procter and Anthony Dunn are some of the people who cannot open the door at the start, even though some of them have found the diary by climbing into the chest. I hinted at this last time, but this month the exact solution: TYPE 29285 (Frodo's birthday). Then sit back and watch the fun. In part 2, Duncan North cannot escape the Goblin's Dungeon. First DIG SAND to discover the trapdoor, which is opened in Hobbit fashion. EXAMINE the TORCH which you'll find and INSERT BATTERY. To leave, THROW ROPE until it catches on the window, then PULL ROPE.

Duncan North is also finding life as a super-hero tough, in the budget rerelease of Scott Adams' yawnsome **Hulk**. To combat high gravity you must PRESS BUTTON once. BITE LIP and you'll become ol' green skin, and, although you're told the room fills with gas, you do not immediately revert to being Bruce Banner. Before this reversal does happen, just GO OUT. And in Tower Of Despair, the black rod is inside the door of Despair. Wear the gauntlet and take the orb. The yellow rod is inside the door of Hope: examine the orb, cover your ears, then take the rod.

Christopher Herbert asks, from deepest Cleveland, some questions about Interceptor's **Heroes of Karn** (now excellent value at £1.99). The pirate is killed with a dagger. When you have found the falcon, you can type BEREN, KILL BAT WITH FALCON. Sooth the spider to sleep by getting Haldir the minstrel to play the Lyre to it.

Marcus Beer wants to murder the girl at the bar in **Valkyrie 17** without being killed off himself. You must buy her a drink with the change from paying your bill. She will then go to powder her nose, and if you follow her to the privacy of the ladies' room, you can dispose of her without interruption. Her handbag is worth further investigation.

Write to me

Life is full of problems, isn't it? Physics homework, British Rail, milk cartons that won't open without spurting all over the kitchen floor. Roland Rat... Then, along comes some computer programmer and creates even more problems for you, horrible frustrating ones that keep you awake at night. So you become even less able to do the Physics, you miss your train, you cut up yourself instead of the milk carton, and Roland Rat becomes even more annoying. Well, let me — kind, unselfish (and conceited—Ed) soul that I am — relieve your troubles. Write your little adventuring difficulty on the coupon you'll see here and send it to: Mindplay Helpline, ZX Computing, No. 1 Golden Square, London W1R 3AB. Then, with that problem solved, maybe you'll also be able to understand Newton's Laws, BR timing, milk carton instructions and... well, I can't do anything about the rat, but you wouldn't want a perfect life anyway would you?

A few rules: British correspondents, please enclose a stamped, addressed envelope if you want a personal reply rather than wait for the magazine to come out. If you are writing from abroad, just enclose an envelope — I'll add the postage. I try to respond within two months but I can take longer (on the other hand, you might receive an immediate reply). I ONLY DEAL WITH ADVENTURES. Not arcade games; nor technical problems (write to Crosswires about those). I'm not too hot on arcventures these days (Gargoyle games included). Finally, please write the name of the game you're writing about on the back of the envelope.

Enough for this month: the goose is getting fatter and the shopping days left to you-know-what dwindling (not that I'll be allowed out to buy anything), so I'll leave you to the mercy of the endless advertisers (being stuck in a dungeon has its advantages sometimes) and hope you'll join me again, bells-a-jingling, next month.

Title: ....

Company: ....

Problem: ....

....

....

I can help solve: ....

Name: ....

Address: ....

....

the war of the shires

Welcome to the second installment of "War of the Shires" by Alan Davis. Sharpen your sword, polish your shield, and let's enter the fray.

In this article we'll be laying the programming foundations for our "fantasy epic" namely, Listing 1. It's a rather lengthy dollop of program to type in, but you can take comfort from the fact that the bulk of the game mechanics and data are contained here. The consequence is that next month you'll be able to get the full game up and running pretty quickly, with relatively little wear and tear on the old fingers. Once you've typed in Listing 1, I strongly recommend that you save a master copy of it *without* auto-run, and set that aside until next month when we'll make the necessary additions. However you do need to try out what you have so far — so here's what you should do to make a temporary "test" version.

With Listing 1 held in memory, enter **CLEAR 59999** and then load in the two code blocks and the map array from the first article **(LOAD "PRINT" CODE: LOAD "UDGS" CODE: LOAD "MAP" DATA x/s ().)** Next type **GOTO 9998,** and all the necessary bits and pieces will be saved to tape for you in the correct order. Rewind the tape, and load in the whole thing from scratch. There will be a delay of some seconds after everything has loaded while the extensive initialisation routines perform their appointed task — on completion of which you'll be invited to press a key in order to get things started in earnest.



the war of the shires

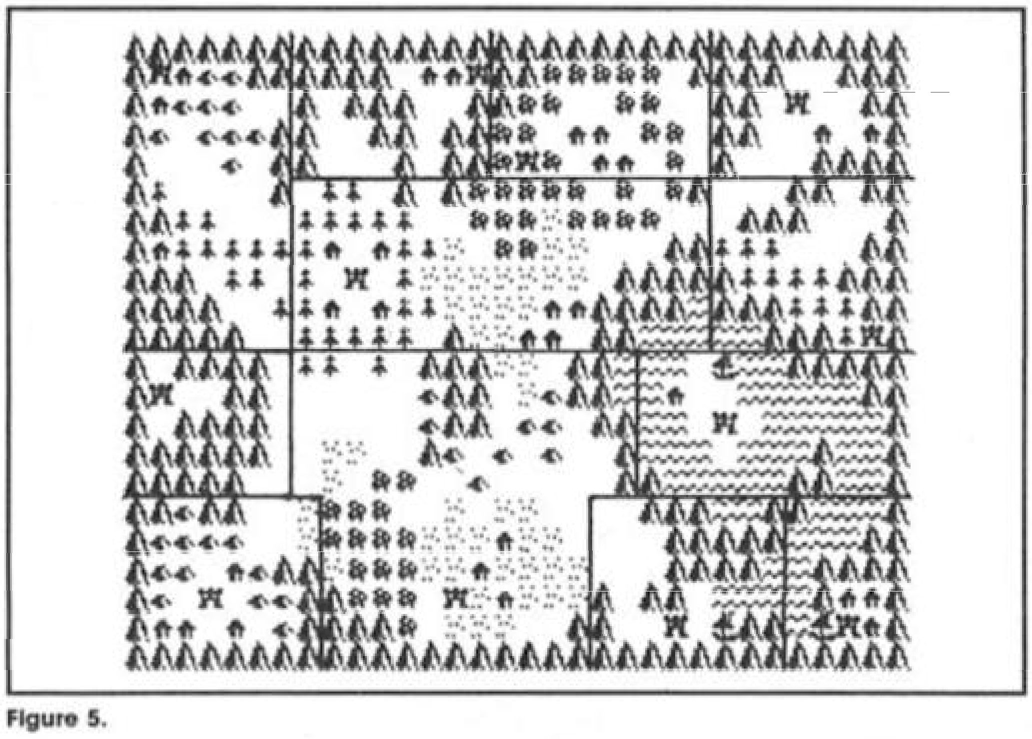


Figure 5.

string z$, and then letting machine code handle the word-wrapping and printing (see the subroutine at line 30, which endures heavy use by the program). Now it's possible to achieve this entirely in BASIC, in fact, though the result is rather "tacky" or "lumpy" printing. This not only slows down the gameplay to some degree, but also lacks polish in presentation, and this is one of those situations where just a dash of machine code makes a world of difference to the flow and smoothness of a game. Another example of how presentation can be improved at little cost is seen in the subroutine at line 15. The program uses this to "decorate" page titles using the UDG corresponding to the current map location. This not only produces pleasant variety in visual impact as the game progresses, but also adds atmosphere in its own right. Simple, but effective — try leaving it out, and see for yourself what you lose.

The program

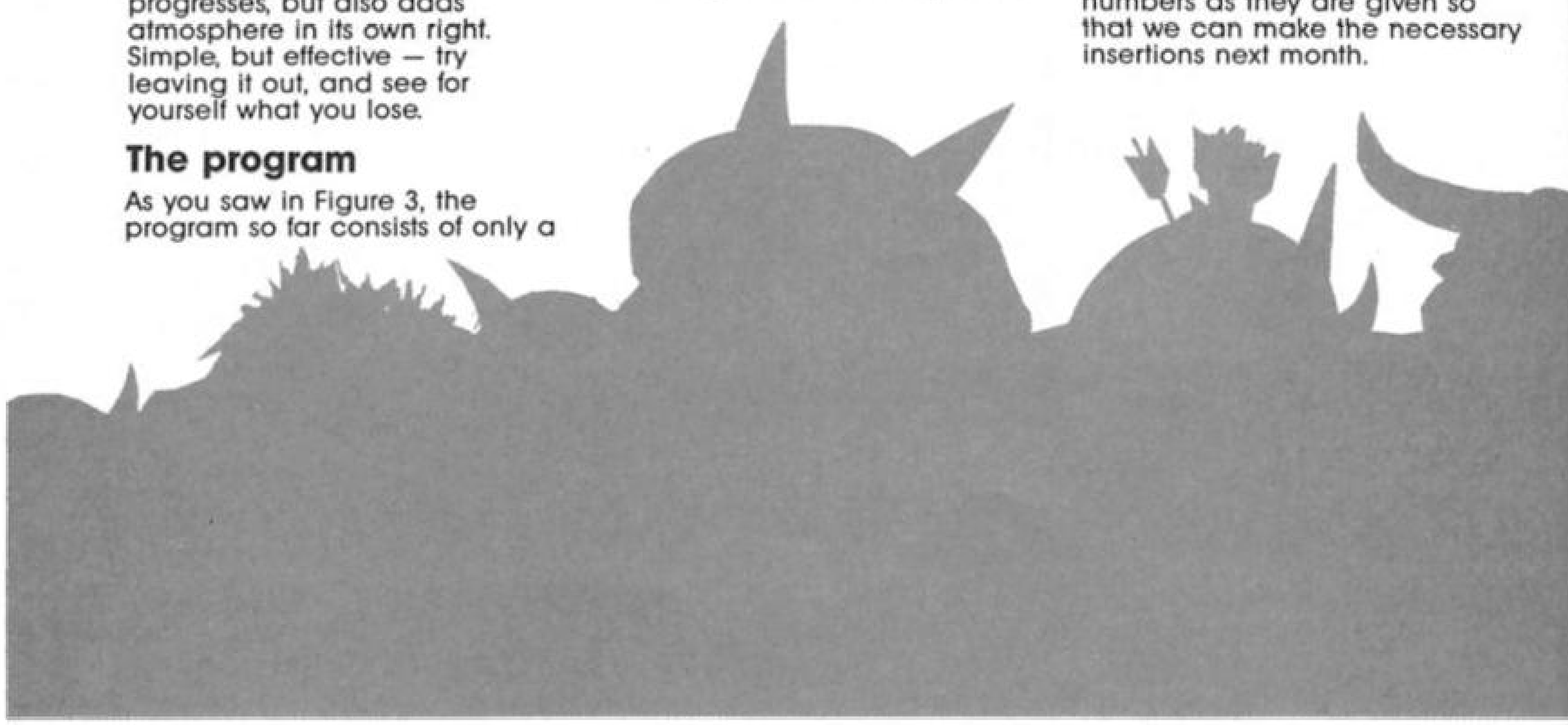
As you saw in Figure 3, the program so far consists of only a few routines and the REMs should help you find your way about, together with the following notes on each section:

1) Main character selection menu (lines 5000-5050). Line 5010 may baffle you a little; this checks each character to see if all his army has been destroyed (in which case he's declared dead) but of course since there are no battles yet this could hardly occur!

2) Character description and options (lines 500-599). Notice that since all characters stay at their respective keeps unless you move them, the "Greet" option is only available if the current location is a keep (CHR$ 149 on the map) and if the potential recruit hasn't already been co-opted (line 540).

3) Search location (lines 1000 onwards). We'll be adding more routines to this next time. The only item of note here concerns what happens when other characters are present at the current location, where the necessary sorting of details to be printed is done in lines 1010-1025. It's a little more complex than you might expect because we must allow for the possible circumstance whereby lots of characters are gathered at the same location — the problem being that the text printing routine can cope only if LEN z$ is less the 255. The difficulty is overcome by printing up z$ in two parts if more than five characters are present.

4) Movement (lines 400-499). The temporary variables nx and ny are used to check conditions of movement, with the appropriate entries for movement to a new location being made in the array a() only when the movement is decreed "legal". This section would have been much simpler had I not decided to incorporate ships into the game, and indeed apart from line 460 (which prevents movement if a mountain blocks the way, or if an army is exhausted) most of the condition tests here concern the business of sailing. Thus you can't move across water unless you're on a ship (line 455); you can't board a ship which is already full (line 458); and if a ship is moved, the map must be changed to leave water in the old location and the ship in the new location (line 465). Line 468 causes the moving army to tire by an amount appropriate to the terrain at the current location. The subroutines for printing the map (lines 45-49) and displaying armies (lines 50-53) are, I hope, fairly straightforward. Don't worry if the line numbering seems odd, by the way; just enter the line numbers as they are given so that we can make the necessary insertions next month.



Finally, a word about keyboard input (lines 20-25). The completed game will run in *real time* i.e. we shall require the enemy to move and attack even though you may be doing nothing but sitting and biting your nails! This means that the usual PAUSE 0: LET i$ = INKEY$ method of picking up a keypress won't do, as it would halt the game indefinitely if no key is pressed. For this reason, input is always collected usingGOSUB 20, whereby the time is continually checked — with repeated jumps to the mysterious subroutine at line 100 as necessary. At present this merely allows tired armies to recover their strength as time passes, but in the third and final article we'll make this a little more exciting! Keep that shield polished — you're going to need it!

Listing 1

```
   1 DEF FN n$(x)=r$(x,3 TO CODE
 r$(x,1)): DEF FN s$(x)=r$(x,COD
E r$(x,1)+1 TO CODE r$(x,2)): DE
F FN r$(x)=FN n$(x)+" of "+FN s$
(x)
   2 DEF FN d$(x)=p$(x,3 TO CODE
 p$(x,2)): DEF FN b$(x)=p$(x,COD
E p$(x,1) TO CODE p$(x,2))
   3 DEF.FN p()=INT ((32-LEN z$)
/2)
   4 DEF FN n(x)=5-INT (a(x,2)/5
0): DEF FN s(x)=10-INT (a(x,3)/5
0): DEF FN v$(x)=v$(FN n(x),2 TO
 CODE v$(FN n(x),1)): DEF FN q$(
x)=v$(FN s(x),2 TO CODE v$(FN s(
x),1)): DEF FN r(x)=1+INT (RND*x
)
   5 DEF FN c(y,x)=(((x>8 AND x<
20)+(2 AND x<9)+(3 AND x>19 AND
x<28)+(4 AND x>27)) AND y>16)+((
(5 AND x>21)+(12 AND x<8)+(x>7 A
ND x<22)) AND (y<17 AND y>11))+(
((6 AND x>24)+(7 AND x>7 AND x<2
5)+(11 AND x<8)) AND (y<12 AND y
>5))+(((11 AND x<8)+(10 AND x>7
AND x<16)+(8 AND x>15 AND x<25)+
(9 AND x>24)) AND y<6)
   6 DEF FN i(x)=(x=144)+(2 AND
x=148)+(3 AND x=149)+(4 AND (x=1
45 OR x=147 OR x=150 OR x=151))+
(5 AND x=146)
   8 REM ************************
        Short Subroutines
        ************************
   9 PRINT #1; PAPER 7; INK 1;AT
 1,0,,AT 1,4; BRIGHT 1; PAPER 6;
"<<< ANY KEY TO CLEAR >>>": RETU
RN
  10 BEEP .02,39: BEEP .02,40: R
ETURN
  14 REM ************************
        Decorated Page Title
        ************************
  15 LET code=CODE x$(y,x): IF c
ode=32 THEN LET code=153
  16 CLS : PRINT AT 1,0;: GO SUB
 40
  17 LET z$=CHR$ code: FOR i=1 T
O 5: LET z$=z$+z$: NEXT i: INK F
N i(code): PAPER 6: PRINT AT 0,0
;z$;AT 2,0;z$: PRINT AT 1,0;z$(
TO 2);AT 1,30;z$( TO 2);AT 4,0;:
 INK 0: PAPER 7
  18 RETURN
  19 REM ************************
          Keyboard Input
        ************************
  21 PAUSE 75: LET i$=INKEY$: IF
 i$<>"" THEN GO SUB 10
  22 GO SUB 100
  24 IF i$="" THEN GO TO 20
  25 RETURN
  29 REM ************************
            Word-wrap
        ************************
  30 LET z$=z$+".": LET prt=USR
60200: RETURN
  39 REM ************************
       Centre String Printing
        ************************
  40 PRINT TAB FN p();z$: RETURN

  44 REM ************************
            Print Map
        ************************
  46 LET armies=0: LET m=USR 600
00: LET z$=FN r$(char): PRINT #1
; PAPER 6;AT 0,0,,AT 0,0;TAB FN
p();z$'"Move(5-8)  Armies(1)  Op
tions(0)": PAPER 7: INK 8: PRINT
 AT a(char,5)-1,a(char,4)-1; BRI
GHT 1; OVER 1;" ": RETURN
  49 REM ************************
          Display armies
        ************************
  51 LET armies=1: INK 0: FOR i=
1 TO 70: PRINT AT u(i,5)-1,u(i,4
)-1;CHR$ 154 AND u(i,1): NEXT i
  52 BRIGHT 1: FOR i=1 TO 11: PR
INT AT a(i,5)-1,a(i,4)-1;CHR$ 15
4 AND a(i,1): NEXT i: BRIGHT 0
  53 GO TO 9
 100 LET a(n,2)=a(n,2)+(5 AND a(
n,2)<245): LET n=n+(n<12)-(11 AN
D n=12)
 110 RETURN
 399 REM ************************
            Movement
        ************************
 405 GO SUB 20
 410 IF i$="0" THEN RETURN
 420 IF i$="1" THEN GO SUB 50: G
O SUB 20: GO SUB 45: GO TO 400
 430 IF i$<"5" OR i$>"8" THEN GO
 TO 400
 440 PRINT AT a(char,5)-1,a(char
,4)-1; BRIGHT 0; OVER 1;" "
 450 LET nx=a(char,4)+(i$="8")-(
i$="5"): LET ny=a(char,5)+(i$="6
")-(i$="7")
 455 IF x$(ny,nx)=CHR$ 146 AND x
$(a(char,5),a(char,4))<>CHR$ 152
 THEN GO TO 480
 458 IF x$(ny,nx)=CHR$ 152 THEN
LET full=0: FOR i=1 TO 11: LET f
ull=full+(a(i,4)=nx AND a(i,5)=n
y): NEXT i: IF full THEN GO TO 4
80
 460 IF x$(ny,nx)=CHR$ 144 OR FN
 n(char)=5 THEN GO TO 480
 465 IF x$(ny,nx)=CHR$ 146 THEN
LET x$(ny,nx)=CHR$ 152: LET x$(a
(char,5),a(char,4))=CHR$ 146: PR
INT AT ny-1,nx-1; INK 0;CHR$ 152
;AT a(char,5)-1,a(char,4)-1; INK
 5;CHR$ 146
 468 LET a(char,2)=a(char,2)-5-(
5 AND x$(a(char,5),a(char,4))=CH
R$ 145)-(3 AND ((x$(a(char,5),a(
char,4))=CHR$ 147) OR (x$(a(char
,5),a(char,4)))=CHR$ 151)): IF a
(char,2)<0 THEN LET a(char,2)=0
 470 LET a(char,4)=nx: LET a(cha
r,5)=ny
 480 PRINT AT a(char,5)-1,a(char
,4)-1; BRIGHT 1; OVER 1;" ": GO
TO 400
 499 REM ************************
       Character Description
            and Options
        ************************
 500 LET x=a(char,4): LET y=a(ch
ar,5): LET battle=0: LET z$=FN r
$(char): GO SUB 15
 502 LET z$=FN n$(char)+" stands
 "+FN d$(code-143)+" in the Shir
e of "+FN s$(FN c(y,x))
 505 IF a(char,1) THEN LET z$=z$
+". "+("He" AND  char<>8)+("She"
 AND char=8)+" commands "+STR$ a
(char,1)+" men-at-arms who are "
+FN q$(char)+". At present they
are "+FN v$(char)
 510 GO SUB 30
 520 PRINT ': LET z$="OPTIONS":
GO SUB 40: PRINT : PRINT TAB 2;"
1: Change character"'TAB 2;"2: V
iew map or Move"'TAB 2;"3: Explo
re the "+FN b$(code-143)
 540 IF code=149 THEN LET recr=F
N c(y,x): IF NOT a(recr,6) AND r
ecr<>12 THEN PRINT TAB 2;"5: Gre
et "+FN r$(recr)
 548 PRINT #1; BRIGHT 1; PAPER 6
;AT 1,0;"< Any other key for fre
sh news >"
 550 GO SUB 20
 560 IF i$="1" THEN RETURN
 561 IF i$="2" THEN GO SUB 45: G
O SUB 400: GO TO 500
 562 IF i$="3" THEN GO SUB 1000:
 GO TO 500
 564 IF recr AND i$="5" THEN LET
 char=recr: LET a(recr,6)=1
 599 GO TO 500
 999 REM ************************
          Search Location
        ************************
1000 LET z$=FN r$(char): GO SUB
 15
1005 LET z$=FN n$(char)+" search
es the "+FN b$(code-143): GO SUB
 30
1010 LET pres=0: DIM p(12): FOR
i=1 TO 11: IF a(i,1) AND a(i,4)=
x AND a(i,5)=y AND i<>char THEN
LET pres=pres+1: LET p(pres)=i
1015 NEXT i: IF NOT pres THEN GO
 TO 1100
1016 LET end=(5 AND pres>5)+(pre
s AND pres<=5): LET start=1
1020 LET z$=("He" AND char<>8)+(
"She" AND char=8)+(" also" AND s
tart=6)+" finds ": FOR i=start T
O end: LET z$=z$+FN r$(p(i))+" w
ith "+STR$ a(p(i),1)+" men"+(",
" AND i<>end)+("and " AND end>1
AND i=end-1): NEXT i: GO SUB 30
1025 IF pres>5 AND start=1 THEN
LET end=pres: LET start=6: GO TO
 1020
1030 GO SUB 9: PAUSE 500: GO SUB
 10: LET z$=FN r$(char): GO SUB
15: LET z$=FN n$(char)+" continu
es to search the "+FN b$(code-14
3): GO SUB 30
1250 LET z$=("He" AND char<>8)+(
"She" AND char=8)+" finds nothin
g else": GO SUB 30: GO TO 2090
2090 GO SUB 9: PAUSE 500: CLS :
GO SUB 10
2999 RETURN
4999 REM ************************
       Select Character Menu
        ************************
5000 CLS : LET lives=0: LET char
=0: LET z$="SELECT CHARACTER": L
ET code=154: GO SUB 16: PRINT ''
: FOR i=1 TO 11
5010 IF a(i,6) THEN LET lives=li
ves+(1 AND a(i,1)): PRINT TAB 4;
 INK (2 AND NOT a(i,1));CHR$ (64
+i);":";TAB 7;FN r$(i)
5015 NEXT i
5017 PRINT 'TAB 4;"L: Key to map
 symbols"'TAB 4;"M: Suspend play
"
5020 GO SUB 20: IF i$<"a" OR i$>
"m" THEN GO TO 5020
5025 IF i$="l" THEN GO SUB 7500:
 GO TO 5000
5026 IF i$="m" THEN PRINT #1;AT
1,8;"PLAY SUSPENDED": PAUSE 0: G
O SUB 10: GO TO 5000
5030 IF a(CODE i$-96,6) THEN LET
 char=CODE i$-96: GO SUB 500
5050 GO TO 5000
7499 REM ************************
        Display Map Symbols
        ************************
7500 LET code=149: LET z$="KEY T
O MAP SYMBOLS": GO SUB 16
7505 FOR i=144 TO 153: PRINT TAB
 7; INK FN i(i);CHR$ i;TAB 10; I
NK 0;FN b$(i-143): NEXT i
7510 PRINT TAB 7;CHR$ 154;TAB 10
;"enemy army"'TAB 7; BRIGHT 1;CH
R$ 154; BRIGHT 0;TAB 10;"Shire a
rmy"
7515 GO SUB 9: PAUSE 500: GO SUB
 10: RETURN
7999 REM ************************
      Load Map Array and Code
          and Initialise
        ************************
8000 BORDER 7: PAPER 7: INK 0: C
LEAR 59999: LOAD "MAP" DATA x$()
: LOAD "PRINT"CODE : LOAD "UDGS"
CODE
8900 RESTORE : RANDOMIZE : DIM m
$(22,32): DIM r$(12,20): DIM p$(
10,20): DIM v$(10,21): DIM a(12,
9): DIM u(70,5): DIM t(22,32)
8910 FOR i=1 TO 12: READ x,y,r$(
i,3 TO ): LET r$(i,1)=CHR$ x: LE
T r$(i,2)=CHR$ y: NEXT i
8920 LET z$="THE WAR OF THE SHIR
ES": LET code=149: GO SUB 16: LE
T z$="Thunder rumbles in the Wes
t": PRINT AT 7,0;: GO SUB 40: LE
T z$=FN r$(1): PRINT AT 10,0;: G
O SUB 40: LET z$="prepares for b
attle": PRINT AT 11,0;: GO SUB 4
0
8930 FOR i=1 TO 10: READ x,y,p$(
i,3 TO ): LET p$(i,1)=CHR$ x: LE
T p$(i,2)=CHR$ y: NEXT i
8940 LET ind=0: LET tu=0: LET xt
u=0: LET ytu=0: LET in=0: LET ar
mies=0: LET a(1,6)=1: LET battle
=0: LET char=1: LET n=1
8950 FOR i=1 TO 12: READ a(i,4),
a(i,5): LET a(i,7)=a(i,4): LET a
(i,8)=a(i,5): LET a(i,1)=1000+FN
 r(1000): LET a(i,2)=249: LET a(
i,3)=249: NEXT i
8960 FOR i=1 TO 10: READ x,v$(i,
2 TO ): LET v$(i,1)=CHR$ x: NEXT
 i
8970 FOR i=1 TO 70: LET u(i,1)=1
000+FN r(1000): LET t(13,2)=t(13
,2)+u(i,1): LET u(i,2)=200: LET
u(i,3)=FN r(11): LET u(i,4)=2: L
ET u(i,5)=13: NEXT i: LET tot=t(
13,2)
8980 GO SUB 9: PAUSE 0
8999 GO TO 5000
9000 DATA 8,17,"RolandGreenways"
9001 DATA 8,17,"RanolfDeepmeads"
9002 DATA 8,18,"MorganClearwater
"
9003 DATA 8,17,"AylwinEastlands"
9004 DATA 8,19,"AldredLittlemead
s"
9005 DATA 8,18,"AlaricHighcliffe
"
9006 DATA 8,17,"EgbertNorthwood"
9007 DATA 10,18,"MarianneDeepwoo
d"
9008 DATA 7,16,"EdgarBleakways"
9009 DATA 8,17,"HubertNorthings"
9010 DATA 9,16,"WilliamMarland"
9011 DATA 7,15,"UlricDarkness"
9060 DATA 3,10,"mountain"
9061 DATA 8,20,"upon rolling dow
ns"
9062 DATA 3,7,"water"
9063 DATA 6,13,"in woodland"
9064 DATA 8,14,"in a village"
9065 DATA 10,13,"at the keep"
9066 DATA 6,18,"in green meadows
"
9067 DATA 8,18,"in a pine forest
"
9068 DATA 12,15,"on board ship"
9069 DATA 8,12,"on a plain"
9070 DATA 14,20,4,20,23,21,30,21
,25,14,31,11,10,9,17,5,28,3,15,2
,2,2,2,13
9071 DATA 15,"full of vigour"
9072 DATA 15,"in good fettle"
9073 DATA 15,"a little weary"
9074 DATA 6,"weary"
9075 DATA 21,"in sore need of re
st"
9076 DATA 21,"in excellent spiri
ts"
9077 DATA 16,"in good spirits"
9078 DATA 20,"slightly dispirite
d"
9079 DATA 16,"very dispirited"
9080 DATA 13,"without hope"
9100 DATA 14,20,4,20,23,21,30,21
,25,14,31,11,10,9,17,5,28,3,15,2
,2,2,2,13
9998 SAVE "SHIRES" LINE 8000: SA
VE "MAP" DATA  x(): SAVE "PRINT"
CODE 60000,37.  SAVE "UDGS"CODE
65368,88
```

the war of the shires

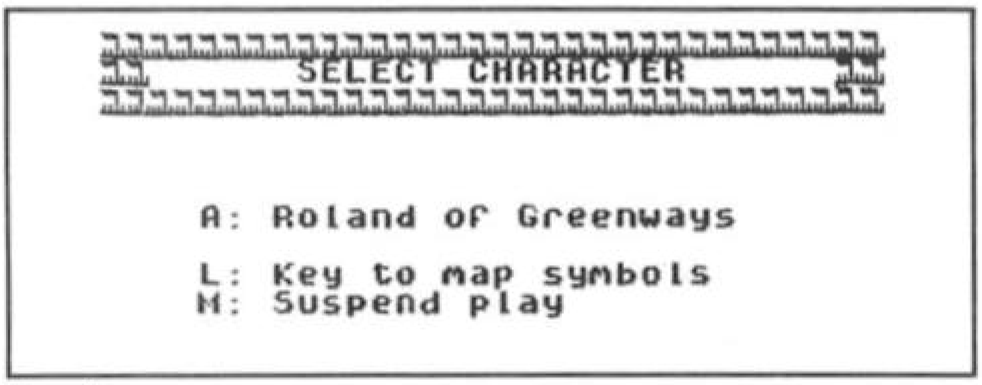


Figure 1.

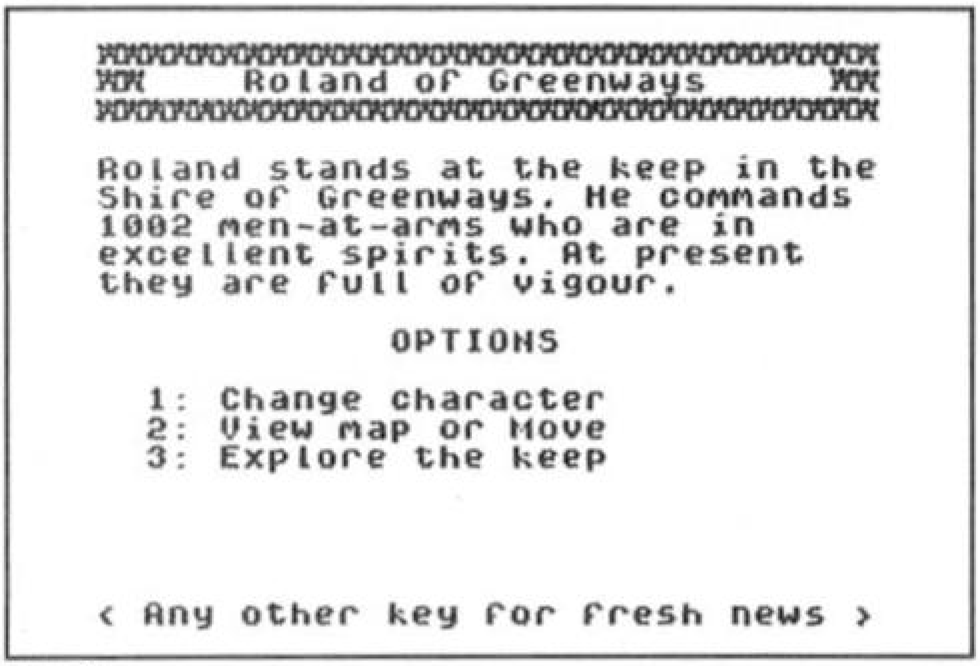


Figure 2.

Main menu

The first thing to greet you is the main character selection menu, as in Figure 1. Your choice is pretty limited at this stage, but things will improve! You can try out the option to display the map symbols (useful to a player until he becomes familiar with them), but of course the "Suspend play" option isn't relevant yet! Selecting option "A", however, calls up something rather more interesting — as shown in Figure 2. This is essentially a description of Roland of Greenways, who is the only controllable character at present, and provides information about where he is, the size and state of his army, and the options available. You can try out the "SEARCH" option — though it won't be terribly informative yet — and indeed tne only option of real interest is "View map or move", which puts the program into "Map" mode. The world map will be displayed, with Roland's position indicated by a bright cursor. All movement in the game takes place in "Map" mode, and the relevant keypresses are indicated at the bottom of the screen.

You can move Roland and his men in any one of four directions using keys 5, 6, 7 and 8 — and at any time you can quit "Map" mode by pressing key "O", which will return you to "character description" mode. (It's worth doing this at intervals during movement in order to see how the army tires during a long march). There's one other important option in "Map" mode: pressing key "I" will cause all army positions to be shown on the map, with enemy armies given in black ink on white paper, and Shire armies in black ink on *bright* white paper. Don't be alarmed by the fact that you see only one enemy army symbol — this is because all enemy armies are in the same place (the Keep of Darkness), and they'll stay there until next month. It's quite safe to explore!

We'll have more to say about 'Armies" mode next time, but for now just press a key to return to simple "Map" mode, and try moving Roland to one of the other keeps. When you arrive, leave "Map" mode — whereupon you'll find a new option presents itself so that you can greet another character, and you'll find from this point onwards that you can switch between characters using the "Change character" option. Incidentally, you'll find that searching a location is a little

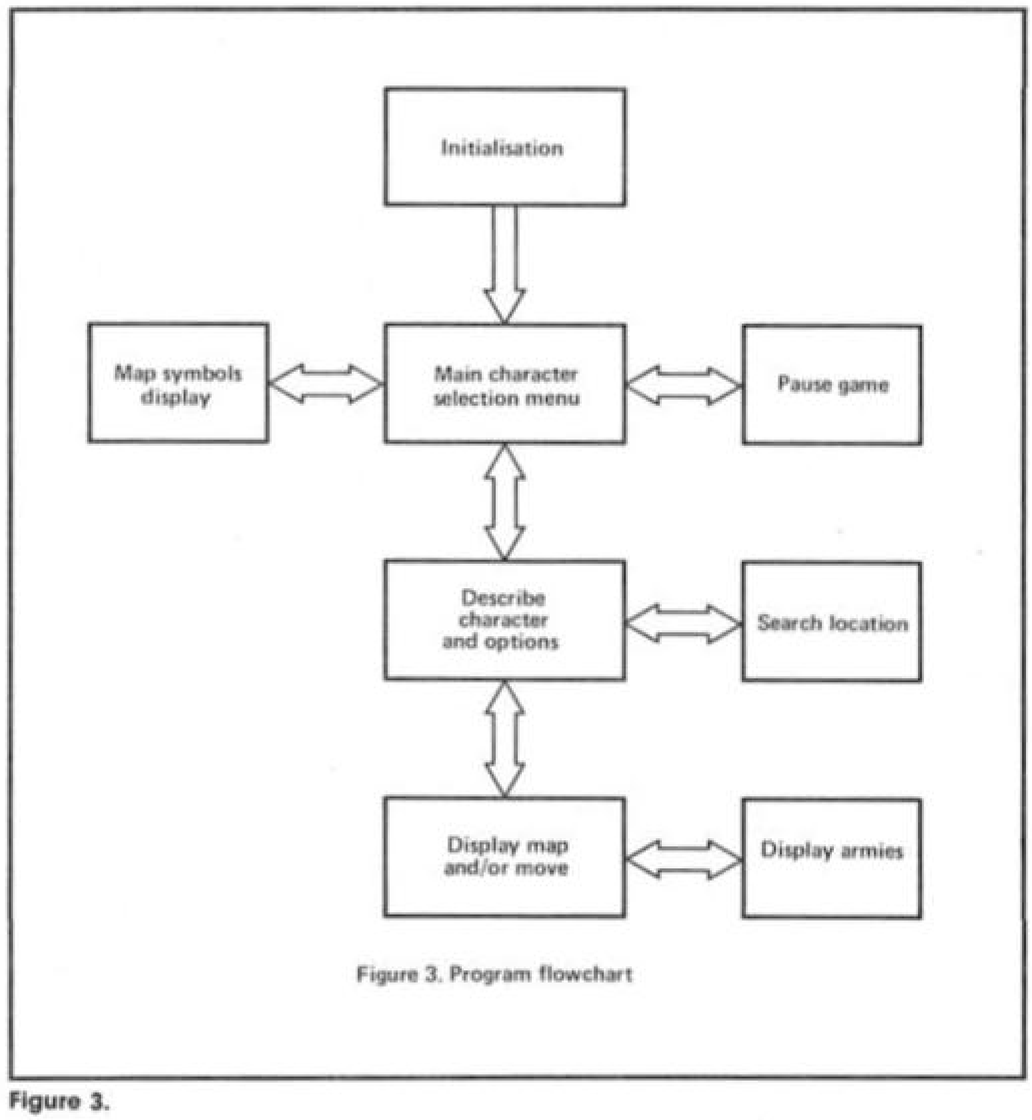


Figure 3.

more interesting when another character and his army are present — though it will offer a great deal more in due course. You're now in a postion to wander about at will, meeting, greeting, and then (if you wish) controlling all the Shire leaders.

D.I.Y.

As I said in last month's article, it's my aim in this series not merely to offer you a game to play, but to provide you with a program base to which you can add developments of your own. So it's important that you understand exactly what each stage of the program is doing in relation to what you see on the screen. You can get a useful overall view of the structure from the "flow chart" I've given in Figure 3, which shows how the various sections of the program are related by the menu selections. Armed with this, let's take a closer look at Listing 1 — starting at the most logical place with the initialisation sequence from line 8000 onwards. After the loading instructions for the code blocks and map array, we find at line 8900 a range of string and numeric arrays being dimensioned. Let's examine the meaning of the string arrays first:

1) f$(12,20) holds the names of the characters followed immediately by the names of the shires they lead.
2) p$(10,20) holds the descriptions of landscape features.
3) v$(10,21) holds the descriptions of army strength and morale (five descriptions for strength, and five for morale).

Information is extracted from these arrays using defined functions (see the first few lines of Listing 1) in a way which will be familiar to those of you who read my earlier "Realms of Interaction" series. The method gives you an immensely powerful system of generating text in games like this, and the relevant functions are as follows:

1) FN n$(x) returns the shortened name of the "xth" character. Thus FN n$(1) gives "Roland".
2) FN f$(x) returns the full title of the "xth" character. Thus FN f$(1) gives "Roland of Greenways".
3) FN s$(x) returns the name of the "xth" shire — so that FN s$(1) is "Greenways".
4) FN d$(x) returns a location description corresponding to the contents of the map array at the current location. Thus FN d$(2) gives "upon rolling downs".
5) FN b$(x) returns the mere name of a landscape feature; thus FN b$(2) gives "rolling downs".

We need to look at the numeric arrays next. These are used to store important parameters concerning the characters and their armies (many of which change as the game progresses). The most important — and the most complex — is a(12,9). Each of its twelve rows corresponds to one of the characters, and each of the nine columns gives a particular parameter for that character as shown in Figure 4.
Initial values for the array are established in line 8950. Note that the DATA statements used here (see line 9100) contain the (x,y) coordinates of the keeps, where each character is positioned at the start. Now you know why I asked you to be careful when positioning the keeps on your map last month! Those array elements not defined here start off, of course, at zero — with the exception of a(1,6) which is set to 1 in line 8940 (Roland being the only "recruited" or controllable character at the start).

The second most important array is u(70,5) which performs the similar, though simpler task of data storage for the 70 enemy armies. Each row corresponds to one of those armies, while each column corresponds to one of five parameters (see Figure 4).

Targets

A word of explanation is needed about the 3rd parameter. The enemy armies are going to be "intelligent", in the sense that each one will be allocated a specific job — that of seeking out and attacking a specific character (the "target"). Parameter 3 is the code of a given army's "target" — so that if Roland is the target, this parameter will take a value of 1. Initial values for the array are set in line 8970. Note that since all enemy armies start off at the keep of Darkness, parameters 4 and 5 are the same in each case i.e. the map coordinates of the keep. Targets are allocated at random, by the way, so that the overall strategy of the enemy will vary from one game to another. This means that each new game presents a fresh challenge to the player. There are two arrays that I haven't mentioned yer; t(22,32) is used to keep track of the *total* number of enemy warriors at each location. The need for this will become apparent next month, when we'll also examine the purpose of m$(22,32) which for the present must remain a mystery. . .

We're now in a position to examine the remaining defined functions. FN n(x) and FN s(x) return a number between 1 and 5 related to the strength and morale respectively of the army led by character "x". FN v$(x) and FN q$(x) use those numbers to generate an appropriate text description of strength and morale, extracted from the array v$(). FN r(x) returns a random integer between 1 and x. FN i(x) returns the INK colour appropriate for a particular UDG (CHR$ x) so that individual map graphic symbols can be printed up from BASIC if necessary. The rather lengthy function FN c(y,x) is used to divide the whole world up into shires, returning for a given pair of map coordinates the number corresponding to a particular shire (1=Greenways, 2=Deepmeads etc). I've shown in Figure 5 how this division occurs, so that you can relate the conditions implicit in the function to the actual divisions on the map. Finally, FN p() is a handy little function for centralising things like titles on screen — see the little subroutine at line 40 for an example of its use.

Before we move on to look at the rest of the program structure, a few general points, largely concerned with presentation, are worth making. The bulk of the text display is achieved by first building up the text in the

a(12,9)

Column	Parameter
1	Size of army
2	Strength of men (0-249)
3	Morale of men (0-249)
4 & 5	(x,y) coordinates of current position on map.
6	"Recruitment" flag (1 if required, 0 if not).
7 & 8	(x,y) coordinates of keep owned by character.
9	Provisions available (0 at start of game).

u(70,5)

Column	Parameter
1	Size of army
2	Strength of warriors (starts at 200)
3	"Target" character
4 & 5	(x,y) coordinates of current position on map.

Figure 4. Parameters held in the arrays a(12,9) and u(70,5)

WARGAMING

QL ERROR TRAPPING

Some advice for QL programmers from Melvin MacKaron

In the last installment on error-trapping with the QL, we discovered the undocumented keywords **WHEN ERRor — END WHEN.** We looked at four different levels of error-trapping, beginning with a "machine-level" segment which stopped the program's execution when an error occurred and progressed to a more sophisticated segment which identified the error number and then took appropriate action. The keyword which lets us re-execute a command is RETRY.

It is imperative when we use the WHEN ERRor construct that we do not exit from it by using GOTO. This may be tempting (and it is used on other computers with the ON ERR — GOTO combination), but if a number of errors occur, the program counter (PC) which keeps track of the line being executed will become "confused" and we will end up in a situation where the camel's back gets one straw too many. One extra error can generate more errors, and the only way to escape will be to reset the QL.

The question, then, becomes, "Can we simulate a GOTO without corrupting the PC stack?" Can we 'trick' the computer into thinking the error occurred elsewhere and force it to exit the **WHEN ERRor** block of code at a point of our choosing? We may use the magician's old technique of misdirection to POKE an error address onto the PC stack and then RETRY from a different location in the program. the QL Technical Guide gives a variable, BV_CNLNO, with a vector of 92h (146 in decimal) which is described as 'line to CONTINUE from'. To POKE a value into the corrrect address, we mus first locate BV_CNLNO. We add its vector (offset) to the length of the job header of SV_BASIC (the bottom of SuperBASIC), getting the number 250. Our code becomes:

POKE_W(PEEK)_L(163856) + 250),nnn. Location 163856 is a "long word"; BV_CNLNO is a word; and nnn is the line from which we wish to proceed. The accompanying listing demonstrates re-direction of our error processing.

Code

Let's take a look at the listing. As you can see, our WHEN ERRor — END WHEN section of code goes at the beginning of the program. This means that you will most probably need to write the body of your masterpiece first so that you will know in advance the lines to re-enter from. Also, I have used a procedure, **carry-on,** to allow the end user to watch each step of the program's progress (this is a useful tool in de-bugging, too).

The main program begins at line 290. To generate an error in this section, when you are promoted for a divisor, enter 0. This will generate an error. I chose to return from the WHEN ERRor section at line 290 so that you're not left "garbage" on the screen when you continue. (NOTE: An alternative to WHEN ERRor in this section could be to put in line 325: **IF divisor=0:GO TO320).**

To advance to the next block of code when you are returned to the main program, use a legal divisor.

Next, we shall do a cartridge format. If you are using disk drives, substitute the appropriate messages and code into the program. When you run this the first time, leave the microdrive empty. This will cause an error. We shall RETRY from line 370 (again, clearing the screen first). You may either elect to format a cartridge or answer "N" to end the program.

As an additional programming note, you will see the use of eqivalence in this program. On most other micro-computers, I would have had to use **IF a$ = 'Y' or a$ = 'y'** to check for upper or lower-case letters (or ask you to use only uppers or lowers in your programs. However, SuperBASIC allows you to simplify and shorter this code by using two "equals" symbols to show that we are checking for equivalent letters. The savings can be significant. In a 50K+ program, recently, I was able to save over 3K by using this technique.

Error-II

The examples I have used in this article are quite simple. In your own programs, you would probably only use re-direction of the program lines if there were the chance of the same error occurring in more than one place. This could happen, for example, with error −16 (Bad or changed medium), which may occur with either a LOAD or a SAVE. But the key idea is that you can now trap for almost any error without resorting to machine language. As I stated last month, the only "error" which you cannot trap by using WHEN ERRor is BREAK (CTRL-SPACE). You could stop a person from intentionally BREAKing the program flow by writing a machine language routine to disable BREAK, but you don't need to. Talent's program suite, Nucleon, has a nice little routine to do this for you. They also have a number of other goodies designed to give your programs a nice polish. No, I do not work for Talent, and this is not an advertisement.

With practice (and a little imagination), you should soon find yourself controlling the flow of your programs quite nicely. It's very easy once you know how.

If you have any questions about error-trapping on the QL (or other aspects of programming this machine), please write c/o ZX Computing Monthly. If you need a personal response, enclose a SAE.

Listing

Error-Trapping Demonstration

```
10 REMark Advanced Error-Trapping
20 REMark This program module demonstrates use of strategic POKEs
30 REMark to control the exit (and re-entry) points of a program
40 REMark from a WHEN ERRor routine.
50 REMark
60 MODE 0 : PAPER 0 : INK 7 : CLS : REMark Set Display
70 WHEN ERRor
80    BEEP 2000,12 : PAUSE 5
90    BEEP 2000,6  : PAUSE 5
100   BEEP 2000,9  : PAUSE 5 : REMark attention-getting tones
110   errnum = PEEK_L(PEEK_L(163856) + 298)
120   SELect ON errnum
130     = -18
140       PRINT \'Error!  You have attempted to divide by zero.'
150       carry_on
160       POKE_W(PEEK_L(163856) + 250),290
170       RETRY
180     = -14
190       PRINT \'Format FAILED!'
200       carry_on
210       POKE_W(PEEK_L(163856) + 250),370
220       RETRY
230   END SELect
240 END WHEN
250 DEFine PROCedure carry_on : REMark A Simple Wait Routine
260   PRINT \'Press any key to continue...'
270   PAUSE : REMark infinite wait
280 END DEFine carry_on
290 CLS
300 PRINT 'Error in Division Demonstration'
310 PRINT
320 INPUT 'Enter Divisor:  ';divisor
330 INPUT 'Enter Dividend: ';dividend
340 quotient = dividend / divisor
350 PRINT \'The result is ';quotient
360 carry_on
370 CLS : PRINT 'Failed Format Demonstration'
380 PRINT : PRINT 'This next section recovers from a failed
    format.'
390 PRINT 'If you use this section in earnest, you will need a'
400 PRINT 'blank micro-cartridge (or diskette).'
410 PRINT
420 PRINT 'Do you wish to format a cartridge? (y/n)'
430 REPeat choice
440   a$ = INKEY$
450   IF a$ == 'y'
460      PRINT 'Place a blank cartridge in mdv1_' : REMark (or
    flp1_)
470      carry_on
480      FORMAT mdv1_testcart : REMark (or FORMAT flp1_)
490   END IF
500   IF a$ == 'n' : EXIT choice
510 END REPeat choice
520 CLS
530 PRINT 'Congratulations!  You are now a Master Error-Trapper.'
540 PRINT \'We are declaring "open season" on wild errors, so'
550 PRINT 'go trap as many as you can.'
560 STOP
```

PROGRAMMING



Santa's Dilemma

David Nowotnik presents ZX's special Christmas game which can be played on any model of the Spectrum or a QL.

Santa Claus is just about to leave his Grotto on Christmas Eve to deliver Christmas presents, when, to his horror, he finds that someone has left open the gates to his reindeer pen. All the reindeer have got out, and escaped into the forest. He has to recover six of them to enable him to get underway to deliver his presents.

Using the cursor keys (5,6,7,8 on the Spectrum) you have to guide Santa around the forest. Reindeer are quite timid beasts, and they will move away from Santa when he stands next to them. In this way he must guide them one at a time to the entrance of the reindeer pen. At the base of the screen is a counter which tells you the number of presents which Santa has time to deliver. Naturally, this is your 'score', the more you get, the more children will receive their presents, and the better you'll feel!

Fig.1. contains the listing for the Spectrum, and fig.2. has the listing for the QL. The two programs are virtually identical in operation, so anyone keen to compare Spectrum and QL styles should find this a good example. The QL program will ask you if you want another game at the end, but with the Spectrum version you have to RUN again for a repeat game.

UDGs

Both programs use user defined graphics. On the Spectrum, you'll have to be careful to enter certain characters in graphics mode to provide you with the correct UDGs. Those characters should appear slightly darker in the listing; in case they aren't too clear, these characters appear in lines 520,1560,1580,1730,1790, and 1870. QL users need not be so cautious, as there are no similar traps. If you haven't met UDGs on the QL before, then glance at lines 250 to 380, where they are created and installed.

There are 10 reindeer altogether, so you have a reasonable choice in retrieving the most accessible reindeer. If you want to make the game easier, or more difficult, then change the number of reindeer or trees in lines 1470 and 1520 of the Spectrum listing, or 1660 and 1760 of the QL listing.

To accompany the game, there is a seasonal tune, which shows what can be done with the limited BEEP command. It also expresses a seasonal greeting from everyone at ZX Computing Monthly to all our readers.

Fig. 1 Spectrum Listing

```
10 REM  Santa's dilemma
20 REM by David Nowotnik
30 REM  October, 1986
40 REM
50 REM    udgs
60 LET a= USR "a"
70 FOR i=0 TO 31: READ q
80 POKE a+i,q: NEXT i
90 DATA 24,60,24,126,60,255,126,255
100 DATA 24,24,24,24,24,24,60,60
110 DATA 10,10,14,142,124,124,68,68
120 DATA 24,24,60,90,189,60,126,126
130 BORDER 0: PAPER 7: INK 0: CLS
450 GO TO 1000
500 REM   Subroutines
510 REM 1. Print trees
520 PRINT  INK 4; AT y,x;"A"; INK 3; AT y+1,x;"B": RETURN
530 REM Press a key
540 PRINT  AT 21,1; INVERSE 1;"   Press any key to continue
"
550 IF  INKEY$ <> "" THEN  GO TO 550
560 IF  INKEY$ ="" THEN  GO TO 560
570 LET z$= INKEY$ : RETURN
600 REM Merry Christmas
610 RESTORE 650
620 FOR i=1 TO 29
630 READ a: READ b: IF a=99 THEN  PAUSE b: GO TO 630
640 BEEP a,b: NEXT i
650 DATA .5,0,.25,5,99,10,.25,5,.25,7,.25,5,.25,4,.5,2,99,2,
.5,2
660 DATA 99,5,.5,2,.25,7,99,10,.25,7,.25,9,.25,7,.25,5,.25,4,
99,10,.25,4,99,10
670 DATA .5,4,.25,9,99,10,.25,9,.25,10,.25,9,.25,7,.5,5,.5,2
680 DATA .5,0,.5,2,.5,7,.5,4,.5,5
690 RETURN
1000 REM Print Title
1010 FOR i=1 TO 50
1020 LET y= RND *20: LET x= RND *31
1030 IF  ATTR (y+1,x)=60 THEN  GO TO 1020
1040 GO SUB 510: NEXT i
1050 PAUSE 100
1060 PRINT  AT 5,12; INK 6; PAPER 1;"SANTA'S"
1070 PAUSE 50
1080 PRINT  AT 8,11; FLASH 1;" DILEMMA "
1090 PAUSE 100: GO SUB 600
1100 PAUSE 100: BORDER 2: CLS
1110 PRINT  AT 2,9; PAPER 1; INK 6;" Santa's Dilemma "'''
1120 PRINT "  It's Christmas Eve, and Santa wants to get
under way to "
```

```
1130 PRINT "deliver sackfulls of super microgames to all those lucky girls"
1140 PRINT "and boys whose parents have     bought them Spectrums, QLs,"
1150 PRINT "and other micros for Christmas."''
1160 PRINT "  But someone has left his gatesopen, and all the reindeer have"
1170 PRINT "got out. You'll have to guide   Santa to help him get 6 reindeer";
1180 PRINT "back into the pen at the left ofthe screen."
1190 GO SUB 530: CLS
1200 PRINT  AT 2,9; PAPER 1; INK 6;" Santa's Dilemma "'''
1210 PRINT "  You guide Santa by using the  cursor keys (5-8). The Reindeer"
1220 PRINT "will move away from Santa when  he stands next to them."''
1230 PRINT " You have to get 6 Reindeer intothe pen as fast as possible. The";
1240 PRINT "number at the bottom of the     screen is the number of presents";
1250 PRINT "Santa has time to deliver. As   you want to disappoint as few"
1260 PRINT "children as possible, aim to    drive the Reindeer into the pen"
1270 PRINT "as quickly as you can."''
1280 PRINT "          Good luck"
1290 GO SUB 530
1300 REM Initialise Variables
1310 LET sany=8: LET sanx=2
1320 RESTORE 5000: DIM m(4,2)
1330 FOR i=1 TO 4: READ m(i,1): READ m(i,2): NEXT i
1340 DIM r(8,2)
1350 FOR i=1 TO 8: READ r(i,1): READ r(i,2): NEXT i
1360 LET tr=0
1400 REM Set up the screen
1410 BORDER 0: INK 0: PAPER 7: CLS
1420 INK 3: PRINT  AT 6,0;"██████"
1430 PRINT  AT 14,0; INVERSE 1;"██████"
1440 FOR i=7 TO 13: IF i=10 THEN  GO TO 1460
1450 PRINT  AT i,5; INVERSE 1;"█"
1460 NEXT i: INK 0
1470 FOR i=1 TO 50
1480 LET y= RND *20: LET x= RND *31
1490 IF x<10 AND (y>3 AND y<16) THEN  GO TO 1480
1500 IF  ATTR (y+1,x)=60 THEN  GO TO 1480
1510 GO SUB 510: NEXT i
1520 FOR i=1 TO 10
1530 LET y=1+RND *20: LET x=1+RND *29
1540 IF x<10 AND (y>3 AND y<16) THEN  GO TO 1530
1550 IF  ATTR (y,x) <> 56 THEN  GO TO 1530
1560 PRINT  AT y,x; INK 1;"C"
1570 NEXT i
1580 PRINT  AT 8,2; INK 2;"D"
1590 POKE 23672,0: POKE 23673,0
1600 REM Go get them!
1610 LET b= PEEK 23672+256* PEEK 23673: LET p=65000-b
1620 IF p>60000 THEN  LET p=60000
1630 PRINT #1; AT 0,0;" Presents: ";p;" "
1640 IF p<30000 THEN  GO TO 2000
1650 REM Move Santa
1660 GO SUB 3000: IF z=0 THEN  GO TO 1600
1680 LET y=sany+m(z,1): LET x=sanx+m(z,2)
1690 IF  ATTR (y,x) <> 56 THEN  GO TO 1600
1700 IF y<0 OR y>21 OR x<0 OR x>31 THEN  GO TO 1600
1710 PRINT  AT sany,sanx;" "
1720 LET sany=y: LET sanx=x
1730 PRINT  AT y,x; INK 2;"D": BEEP .01,-5
1740 REM Shoo reindeer
1750 FOR i=1 TO 8
1760 LET y=sany+r(i,1): LET x=sanx+r(i,2)
1770 IF  ATTR (y,x) <> 57 THEN  GO TO 1800
1775 IF y<1 OR y>20 OR x<1 OR x>30 THEN  GO TO 1800
1780 IF  ATTR (y+r(i,1),x+r(i,2)) <> 56 THEN  GO TO 1800
1790 PRINT  AT y,x;" "; AT y+r(i,1),x+r(i,2); INK 1;"C": BEEP .01,5
1800 NEXT i
1810 IF  ATTR (10,5) <> 57 THEN  GO TO 1600
1820 LET tr=tr+1
1830 FOR i=1 TO 5
1840 BEEP .15,-5: BEEP .15,0: BEEP .15,5
1850 NEXT i
1860 PRINT  AT 10,5;" "
1870 PRINT  AT 6+tr,0; INK 1;"C"
1880 IF tr<6 THEN  GO TO 1600
1890 PAUSE 100: GO SUB 600: PAUSE 200
1900 BORDER 2: CLS
1910 PRINT  AT 4,8;"Santa can deliver "; AT 6,9;p;" presents."
1920 PRINT  AT 10,0;
1930 IF p<40000 THEN  PRINT "You've disappointed many children": GO TO 1980
1940 IF p<55000 THEN  PRINT "Not too bad, but Santa will haveto miss quite alot of children.": GO TO 1980
1950 PRINT "Well done; there won't be too    many disappointments tonight."
1980 PAUSE 100: GO SUB 600
1990 GO TO 2060
2000 FOR i=20 TO -10 STEP -.5
2010 BEEP .05,i: NEXT i
2020 CLS
2030 PRINT  AT 4,0;"Oh dear! You've failed to catch enough reindeer in time."
2040 PRINT  AT 9,0;"How can you ever forgive your-  self for all the broken hearts"
2050 PRINT "you have caused!"
2060 PAUSE 500: RUN
2070 STOP
3000 LET z$=INKEY$: LET z=0
3010 IF z$="" THEN RETURN
3020 LET z= CODE z$
3030 IF z>51 AND z<57 THEN LET z=z-52: RETURN
3040 IF z=8 THEN LET z=1: RETURN
3050 IF z=9 THEN LET z=4: RETURN
3060 IF z=10 THEN LET z=2: RETURN
3070 IF z=11 THEN LET z=3: RETURN
3080 z=0: RETURN
5000 DATA 0,-1,1,0,-1,0,0,1
5010 DATA -1,0,-1,-1,1,0,1,1,-1,1,1,-1,0,1,0,-1
```

Fig. 2 QL Listing

```
10 REMark Santa's Dilemma
20 REMark by David Nowotnik
30 REMark October, 1986
40 :
100 init: TITLE: INSTRUCTIONS
110 REPeat main_loop
120 SET_UP_SCREEN: GAME: END_MESSAGE
130 PRINT #0\"        Another game (y/n)?"
140 REPeat get_reply
150   z$=INKEY$(-1)
160   IF z$="y" OR z$="n" THEN EXIT get_reply
170 END REPeat get_reply
180 CLS #0
190 IF z$="n" THEN EXIT main_loop
200 END REPeat main_loop
210 CLS: STOP
220 :
230 DEFine PROCedure init
240 LOCal a,n,byt
250 REMark UDGs
260 a= RESPR (0)
270 IF a>261900 THEN a= RESPR (244)
280 POKE_L (PEEK_L (166756)+46),a
290 RESTORE 330
300 FOR n=0 TO 46
310   READ byt: POKE (a+n),byt
320 END FOR n
330 DATA 127,15
340 DATA 0,0,0,0,0,0,0,0,0
350 DATA 56,56,16,56,56,124,124,40,108
360 DATA 20,28,28,8,124,124,124,68,68
370 DATA 0,16,16,56,56,124,124,56,124
380 DATA 16,16,16,16,16,16,56,56,0
390 REMark WINDOWS
400 MODE 8
410 WINDOW 512,256,0,0
420 PAPER 0: CLS
430 WINDOW 406,230,44,0
440 BORDER 5,2
450 PAPER 7: CLS
460 CSIZE 0,0
470 WINDOW #0,406,24,44,230
480 BORDER #0,2,1
490 PAPER #0,0: INK #0,7: CLS #0
500 REMark VARIABLES
510 DIM screen$(32,22)
520 sany=8: sanx=2
530 DIM m(4,2),r(8,2)
540 FOR n=1 TO 4
550   READ m(n,1),m(n,2)
560 END FOR n
570 FOR n=1 TO 8
580   READ r(n,1),r(n,2)
590 END FOR n
600 tr=0
610 DATA 0,-1,1,0,-1,0,0,1
620 DATA -1,0,-1,-1,1,0,1,1
630 DATA -1,1,1,-1,0,1,0,-1
640 santa$= CHR$(128): r_deer$= CHR$(129)
650 tree_top$= CHR$(130): stump$=CHR$(131)
660 empty$= CHR$(0)
670 END DEFine PRINT
680 :
690 DEFine PROCedure PRINT_TREE (x,y)/x
700 INK 4: AT y,x: PRINT tree_top$;
710 INK 3: AT y+1,x: PRINT stump$;
720 screen$ (x+1,y+1)=tree_top$
730 screen$ (x+1,y+2)=stump$
740 END DEFine PRINT_TREE
750 :
760 DEFine PROCedure TITLE
770 LOCal i,x,y
780 FOR i=1 TO 50
790   REPeat title_loop_1
800     y= RND (20): x=RND (31)
810     IF screen$(x,y+1)<>tree_top$ THEN EXIT title_loop_1
820   END REPeat title_loop_1
830   PRINT_TREE x,y
840 END FOR i
850 CSIZE 3,1: OVER 1
860 AT 4,8: INK 2: PRINT "SANTA'S"
870 FLASH 1: AT 6,8: PRINT "DILEMMA"
880 FLASH 0: CSIZE 0,0: OVER 0
890 TUNE
900 END DEFine TITLE
```

```
910 :
920 DEFine PROCedure TUNE
930 RESTORE 1010
940 READ time: POKE_W 163886,time
950 REPeat tune_loop
960   REPeat delay
970     IF PEEK_W (163886)>time THEN EXIT delay
980   END REPeat delay
990   READ note,time
1000   SELect ON note
1010   =0: BEEP
1020   =255: EXIT tune_loop
1030   = REMAINDER : BEEP 10000,note
1040   END SELect
1050 END REPeat tune_loop
1060 DATA 330,18,368,0,371,11,405,0,409
1070 DATA 11,424,0,426,9,434,0,448,11,463
1080 DATA 0,469,12,481,0,485,15,517,0,522
1090 DATA 15,554,0,558,15,577,0,593,9,619
1100 DATA 0,630,9,649,0,654,7,665,0,671
1110 DATA 9,684,0,688,11,703,0,709,12,740
1120 DATA 0,751,12,776,0,787,12,811,0,840
1130 DATA 7,872,0,876,7,893,0,899,6,905
1140 DATA 0,915,7,926,0,932,9,945,0,949
1150 DATA 11,978,0,988,15,1016,0,1027,18,1051
1160 DATA 0,1060,15,1088,0,1099,9,1125,0,1136
1170 DATA 12,1166,0,1176,11,1233,0,1267
1180 DATA 255,1267
1190 END DEFine TUNE
1200 :
1210 DEFine PROCedure INSTRUCTIONS
1220 CLS: INK 1: AT 2,9
1230 PRINT "Santa's Dilemma"\\\
1240 PRINT "   It's Christmas Eve, and Santawants to get
underway to"
1250 PRINT "deliver sackfulls of super microgames to all
those lucky girls"
1260 PRINT "and boys whose parents have     bought them
Spectrums, QLs, "
1270 PRINT "and other micros for Christmas."
1280 PRINT "  But someome has left his gatesopen, and all the
reindeer have"
1290 PRINT "got out. You'll have to guide   Santa to help him
get 6 reindeer";
1300 PRINT "back into the pen at the left ofthe screen."
1310 GET_A_KEY
1320 INK 1: CLS: AT 2,9
1330 PRINT "Santa's Dilemma"\\\
1340 PRINT "   You guide Santa by using the cursor keys. The
Reindeer will"
1350 PRINT "move away from Santa when he    stands next to
them."\\
1360 PRINT " You have to get 6 reindeer intothe pen as fast
as possible. The"
1370 PRINT "number at the botton of the     screen is the
number of presents"
1380 PRINT "Santa has time to deliver. As   you want to
disappoint as few"
1390 PRINT "children as possible, aim to    drive the six
reindeer into the pen as quickly as you can."
1400 PRINT "              Good luck!"
1410 GET_A_KEY
1420 END DEFine INSTRUCTIONS
1430 :
1440 DEFine PROCedure GET_A_KEY
1450 INK 2: AT 21.3
1460 PRINT "Press any key to continue"
1470 REPeat key_loop
1480   IF INKEY$(0)<>"" THEN EXIT key_loop
1490 END REPeat key_loop
1500 END DEFine GET_A_KEY
1510 :
1520 DEFine PROCedure SET_UP_SCREEN
1530 DIM screen$(32,22)
1540 CLS: PAPER 0
1550 FOR j=6,14
1560   FOR i=0 TO 5
1570     AT j,i: PRINT " "
1580     screen$ (i+1,j+1)="W"
1590   END FOR i
1600 END FOR j
1610 FOR i=7,8,9,11,12,13
1620   AT i,5: PRINT " "
1630   screen$ (6,i+1)="W"
1640 END FOR i
1650 PAPER 7
1660 FOR i=1 TO 50
1670 REPeat set_up_loop
1680   x=RND(31):y=RND(20)
1690   ll=(x>10 OR y<3 OR y>16)
1700   lk=(screen$(x+1,y+2)=empty$)
1710   IF ll AND lk THEN EXIT set_up_loop
1720 END REPeat set_up_loop
1730 PRINT_TREE x,y
1740 END FOR i
1750 INK 1
1760 FOR i=1 TO 10
1770   REPeat deer_loop
1780     x=RND(29)+1: y=RND(19)+1
1790     ll=(x>10 OR y<3 OR y>16)
1800     lk=(screen$(x+1,y+1)=empty$)
1810     IF ll AND lk THEN EXIT deer_loop
1820   END REPeat deer_loop
1830   AT y,x: PRINT r_deer$
1840   screen$(x+1,y+1)=r_deer$
1850 END FOR i
1860 INK 2: AT 8,2: PRINT santa$
1870 sanx=2: sany=8
1880 screen$ (3,9)=santa$
1890 POKE_W 163886,0
1900 END DEFine SET_UP_SCREEN
1910 :
1920 DEFine PROCedure GAME
1930  LOCal b,x,y,x1,y1,move_santa,deer_collected
1940 deer_collected=0
1950 REPeat game_loop
1960 b=PEEK_W (163886): p=65000-b
1970 IF p>60000 THEN p=60000/x
1980 CURSOR #0,40,4: PRINT #0,"Presents = ";p;" "
1990 IF p<30000 THEN EXIT game_loop
2000 z=KEYROW(1): move_santa=0
2010 SELect ON z
2020 =2: move_santa=1
2030 =128: move_santa=2
2040 =4: move_santa=3
2050 =16: move_santa=4
2060 END SELect
2070 IF move_santa THEN
2080   INK 2: BEEP 50,20
2090   x=sanx+m(move_santa,2)
2100   y=sany+m(move_santa,1)
2110   IF y>-1 AND y<22 AND x>-1 AND x<32
2120     IF screen$(x+1,y+1)=empty$ THEN
2130       AT sany,sanx: PRINT " ";
2140       screen$(sanx+1, sany+1)=empty$
2150       sanx=x: sany=y
2160       AT sany,sanx: INK 2: PRINT santa$
2170     END IF
2180   END IF
2190 END IF
2200 FOR i=1 TO 8
2210   y=sany+r(i,1): x=sanx+r(i,2)
2220   IF y>-1 AND y<22 AND x>-1 AND x<32 THEN
2230     IF screen$(x+1,y+1)=r_deer$ THEN
2240       y1=y+r(i,1): x1=x+r(i,2)
2250       IF y1>-1 AND y1<22 AND x1>-1 AND x1<32 THEN
2260        IF screen$(x1+1,y1+1)=empty$ THEN
2270         INK 1
2280         AT y,x: PRINT " ";
2290         AT y1,x1: PRINT r_deer$;
2300         screen$(x+1,y+1)=empty$
2310         screen$(x1+1,y1+1)=r_deer$
2320         BEEP 50,5
2330        END IF
2340      END IF
2350    END IF
2360  END IF
2370 END FOR i
2380 IF screen$ (6,11)=r_deer$ THEN
2390   INK 1: AT 10,5: PRINT " "
2400   screen$ (6,11)=empty$
2410   AT deer_collected+7,0: PRINT r_deer$
2420   BEEP 100,2
2430   screen$(1,deer_collected+8)=r_deer$
2440   deer_collected=deer_collected+1
2450 END IF
2460 IF deer_collected=6 THEN EXIT game_loop
2470 END REPeat game_loop
2480 END DEFine GAME
2490 :
2500 DEFine PROCedure END_MESSAGE
2510 PAUSE 200: CLS: INK 0: CLS #0
2520 AT 4,4: PRINT "Santa can deliver ";p\"
presents"
2530 AT 8,2
2540 SELect ON p
2550 =55000 TO 66000: PRINT "Well done! There won't be too
many disappointments tonight.": TUNE
2560 =40000 TO 54999: PRINT " Not bad, but Santa will have
to miss quite a few childern.": TUNE
2570 =30000 TO 39999: PRINT "You've disappointed many"\"
children tonight!"
2580 = REMAINDER : PRINT "Oh dear! You've failed to
catch enough reindeer in time."
2590 END SELect
2600 IF p<40000 THEN
2610   FOR i=1 TO 20 STEP .25
2620     BEEP 1000,i
2630   END FOR i
2640    PAUSE 50: TUNE
2650 END IF
2660 END DEFine END_MESSAGE
```



QL COLUMN

Brian Beckett looks for signs of life in the QL at the recent ZX Microfair.

Well we've finally had another ZX Microfair and there were a lot more QL's in sight than there were at the PCW Show. Looking around the various exhibit rooms (they held it in Westminster's Central Hall this time), the place *was* a honeycomb of little rooms filled with crowds of news-hungry Sinclair lovers) you wouldn't have known that the QL is officially dead unless you dug deep and asked the right questions.

All our old favourite suppliers were there and a couple of newer ones to boot. But underneath all the bustle and good cheer, nobody had an optimistic word to say about the QL's long-term future and it was a bit like having polite sociability around the bedside of a terminally ill patient who has just been given a revised estimate by the medical staff.

The French softwarehouse Pyramide was there and exhibited some interesting looking products. I got a QL cryptographic package Pyramid has just released for £12 but there seems to be a tricky feature which erases the program every time I try to encrypt anything. I suspect that I was the lucky one who drew the dodgy microdrive but maybe it's *really* an ultra-security feature in the program which just won't let the user encrypt anything and thereby achieve the world's first true, absolutely unbreakable cipher system.

Those crafty West Germans I mentioned last month have tricked me and got Digital Precision to handle their QL mouse and desk-top software and thereby confounded my prediction that their admittedly excellent package wouldn't be much of a challenge to Britain's very own, home-grown Eidersoft mouse and ICE software. Now it looks like a definite two-horse race and it's difficult to pick the winner. The German package includes Giga-BASIC which includes some mouse functions and adds over 70 commands to Superbasic including graphics, pull-down menus, multi-tasking and sprite functions. The whole package costs around £90 and looks well worth considering if you happen to want a nice WIMP environment to give your QL for Christmas.

As for Eidersoft itself, they've put themselves into CST's new, son-of-QL Thor 640K megabeast in a big way and are distributing the machine and its first genuine business software. Thor computers were displayed all over the place and (according to company spokesmen) orders are flowing in at a rate heretofore unknown in the recorded history of man. Forgetting all the sales talk, the machine does look to be doing reasonably well and rather better than GST first expected. But Amstrad may yet jump in and try to stop GST from marketing what is actually a QL circuit board in a new box with loads of added IBM-like features designed to make you think you're a "real" PC owner. It's a good looking machine but very expensive for those of us who grew up on Sinclair price lists and nobody — least of all GST — seems to know what's going to happen when that old supply of QL boards runs out.

Sandy are promoting a new QL-compatible beast due for launch sometime soon after or maybe a bit later. The Specs look good with at least 512K RAM and at least one (but maybe two) 3.5 disc drive and lots of other goodies. Tony Tebby and QJump are still working on the designs so the QLT (supposedly standing for "Quality" and not "QL" but I think the initials are just a little more than coincidence) won't be around for a while and the price isn't certain. About £500 is the current goal for 512K and one disc drive with all the expansions costing as yet undetermined amounts on top. On paper, it looks pretty good and will certainly give the Thor a run for its money but, practically speaking, the Thor is here right now and that's a pretty good sales edge to work with.

Saga Systems has dropped its plans for a stylish QL keyboard on the lines of what the company produces for the Spectrum. This is a real pity as their boards are excellent and really give Sinclair's old black boxes a professional feel, even though the company's best range might be a shade pricey for the average home computer buff.

The company has had a lot of queries about their QL board (largely due to your heroic correspondent's column in this ever-so readable mag) and I got the feeling that a few more callers might just make Saga try for a small run. Otherwise the attitude is an obvious reaction to the QL's recent demise and marketing a new keyboard for a "dead" computer didn't seem to make a lot of business sense. Give Saga a ring (if you have an extra £100 to spend on a keyboard) and you might just add enough weight to a small supply coming on-stream after all.

There's some good news for QL games players. Microdeal (who brought you that top-notch flight simulator) has got at least one more QL game in its stable which should be coming out around Christmas. There's a business strategy game available but as yet not fully marketed from Alexander Wayne of Quanta. It's called Ambition and is for up to four players and you can get information from Quanta or Care Electronics. A friend of mine claims to have beat it on the first go but he's always been known to exaggerate and, from what I've seen, Ambition is well worth looking at. Besides my mate may be an, as yet undiscovered, commercial genius. However this would not seem to be reflected in his bank balance and we shouldn't rely on his word alone. The QL has always needed high quality games and I think it's a shame that something like Ambition didn't come along earlier.

THE SPECTRUM'S SECRET CODES

BY CHARLES BARRON



If you own both a Spectrum and a printer, especially a dot-matrix printer, you may well be tempted to try something more exciting than using the printer for LISTings. On the other hand, getting it to produce its range of variations (italics, double width, condensed, subscript, underlining and all the rest) might seem like a lot of fuss and bother. All those intricate codes to be fed in, the problems of remembering which codes do what and which need to be preceded by the ESC code, and what on earth is an ESC code anyway?

Well, it may not be such a problem as it seems at first because the Spectrum does in fact have built-in single key commands for a great many printer functions — though you won't find this mentioned in the Spectrum manual or indeed in any of the printer manuals that I have seen.

Codes

To understand how it comes about that these codes are available it is necessary to understand a little about how the computer communicates with a full-size printer. When you press, for example, the key marked "a", the message that this sends to the printer is, as always, in figures. In decimal, the code for "a" is 97, and if you enter PRINT CHR$ 97 at the keyboard the screen will show the letter "a".

Your printer, by good fortune, or foresight, also recognises code 97 as a request for the letter "a". Dot-matrix machines will obediently arrange their little pins into the shape of an "a" and daisywheel machines will twiddle their wheels until "a" is under the hammer. Unless there were some agreement about a standard set of codes, we should always have to use a printer of the same make as our computer. Fortunately, manufacturers have agreed on standard codes for most of the alphanumeric characters we need; you may have seen references to the ASCII character set. This has come to be accepted as the international standard but it covers only the codes from 32 to 127. The available range on the Spectrum is from 0 to 255 and it uses almost all of these for one purpose or another. So, probably, does your printer but they may not agree about the meaning of the codes outside the ASCII range. This is where confusion begins — but if you know what you're doing you can take advantage of it.

FIGURE 1

SPECTRUM		CODE	Result on the SHINWA (CP80)	Result in normal mode on the EPSON	Result in Graphics mode on EPSON
Graphics key	0	128	NUL		┼
	1	129	£		┴
	2	130	˙		┬
	3	131	·		┤
	4	132	·		├
	5	133	§		─
	6	134	r		│
	7	135	BEL	BEL	┌
Shifted	7	136	BACKSPACE	BACKSPACE	┐
	6	137	HORIZONTAL TAB	HORIZONTAL TAB	└
	5	138	NEW LINE	NEW LINE	┘
	4	139	VERTICAL TAB	VERTICAL TAB	▒
	3	140	FORM FEED	FORM FEED	■
	2	141	CARRIAGE RETURN	CARRIAGE RETURN	▬
	1	142	DOUBLE WIDTH PRINT	DOUBLE WIDTH	▮
	0	143	CONDENSED PRINT	CONDENSSED	●
UDG letter	A	144	♥		○
	B	145	♦		♠
	C	146	DC2 code	DC2 code	♥
	D	147	♣		♦
	E	148	DC4 code	DC4 code	♣
	F	149	┐		♪
	G	150	├		☎
	H	151	┤		✦
	I	152	┬		●
	J	153	└		∨
	K	154	┘		⅄
	L	155	ESC (control code)	ESC (control)	↑
	M	156	│		↓
	N	157	─		×
	O	158	┴		÷
	P	159	┼		±
	Q	160	SPACE	SPACE	
	R	161	!	!	!
	S	162	"	"	"
	T	163	#	£	£
	U	164	$	$	$

££££

For example, you may have found difficulty in printing the symbol "£" on a full-size printer. This is because the 'A' in ASCII stands for American, so there is a standard code for the American dollar sign, but not for the pound sign. The Spectrum uses code 96 for the pound; that means something different to most printers. On the common machines, Epsons and Shinwas, for example, it comes out as a single inverted comma. To print "£", therefore, you have to find out what code your printer uses for it. On a Shinwa it is code 129; on Epsons it is code 35. Your printer manual should have a list of all the codes it uses and what it uses them for. The Spectrum's vocabulary of codes is printed out in full in Appendix A of the manual.

Interfaces

Before we continue, a word about Spectrum interfaces. The Spectrum uses codes to represent keywords and nearly

PRINTERS

```
FIGURE 2          Useful built-in codes.

EPSON   GRAPHICS MODE.

SHIFTED GRAPHICS KEY  4   ▒
                      3   ■
                      2   ▬
                      1   ▮
                      8   ●
UDG LETTER            A   ○
                      B   ♠
                      C   ♥
                      D   ♦
                      E   ♣
                      F   ♪
                      G   ☎
```

all interfaces include software to decode and print these by intercepting them before they get to the printer.

Most interfaces also allow an option to ignore this decoding system to allow control codes to be sent. Make sure that you set up the interface to operate in this manner, eg.
ZXLprint 3, use LPRINT CHR$ 5
KEMPSTON Centronics E, use COPY: REM CHR$ 0
Interface 1/RS232, use FORMAT "b"; baudrate
Or POKE software so that the Sinclair tokens are OFF (see individual instructions), or else the following will not work.

So far, so good. We can now print "£" by sending CHR$ 129 to a Shinwa or CHR$ 35 to an Epson, instead of the keyboard's £ sign. (You will, of course, have to go outside the inverted commas to do so.) But — hang on a minute. The printers use these codes to print the ' sign but the Spectrum uses them as well, as a glance at the manual reveals. It uses code 129 for the graphics symbol on key 1, and it uses code 35 for the hash sign. So you can avoid coming out of inverted commas when you need the pound sign by sending instead either graphics key 1 or hash, whichever suits your printer.

Now a whole new world opens up. All those graphics keys on the Spectrum, which we know cannot send the block graphics to a printer, are hiding commands which the printer *will* understand but for a different set of purposes. And there are a lot of them: eight graphics keys unshifted; the same eight shifted; and the UDG letters, a to u. Remember that the printer not only translates codes into letters and figures or symbols, it also uses them as commands for all its functions such as carriage return, new line, condensed print, italics, alternative fonts and whatever else your particular printer may offer. If it can do it, there must be a code to tell it to do it. For all the printers of the Epson type almost all of the functions can be called from the Spectrum's graphics keys and this represents a very real convenience — as well as saving a lot of wear and tear on your typing finger tips.



To type a word in italics usually requires something like this:
LPRINT "This is an " CHR$ 27; CHR$ 52; "italics "; CHR$ 27; CHR$ 53; "word".
But using the hidden codes is much easier. Graphics L is the ESC code key — equivalent to CHR$ 27. This reduces the action to:
LPRINT "This is an *gl* 4 italics *gl* 5 word."
No need to interrupt the creative flow by coming out of inverted commas. Needless to say, the printer doesn't print anything for the graphics keys nor for the ordinary numbers 4 and 5 which are the equivalent of CHR$ 52 and CHR$ 53 in the first example.

Sinclair codes

You may have to do a little work to compare your printer codes with the Sinclair codes to find out what will be useful. There are 37 useable codes on the keyboard but not all of them are *useful*. It isn't the most efficient way of getting a space, for example. However, some are interesting, some are fun, and some are very useful indeed. You can probably get a solid black square, for instance, and many printers include a heart, club, diamond and spade as characters just waiting to be used.

Fig.1 shows all the Sinclair codes and what they mean to two typical dot-matrix printers. Fig.2 lists those I find most useful, and I have these on an overlay for my own keyboard. Fig.3 is the LISTing for a short program that will find out what your printer's use of the codes is if your manual keeps it a secret or has been eaten by the cat.

Owners of Epson printers will find that they have a choice of two sets of reactions to the "secret" codes; in normal mode they will carry out control functions on codes 135-143, 146 and 148 with ESC code on 155 (which is UDG 1) but in CG mode (or operating under command I) the Epsons have a range of graphics symbols which are called by the graphics keys. These are shown in Fig.1. These are so useful that they ought to be written on a keyboard overlay.

The Shinwa does not have a choice of modes in this way; instead it offers a mixture of controls and symbols in response to the graphics keys (codes 128-164).

Daisy, daisy

But what of daisywheel printers? Most of this information has been relevant to dot-matrix machines, naturally enough since they offer the widest range of functions, allowing you to select numerous typeface styles as well as graphic symbols. These are not possible on the daisywheel printer, limited to one typeface at a time but these printers *do* respond to the same kinds of codes for the functions that they do have. All will give Line Feed and Form Feed, for example, and most have other formatting functions such as Tabs, Back Space, Margin Set and Line Down.

Some of the daisywheel printers also have useful instructions for bold type, shadow type and, of course, automatic underlining. Check the printer manual for the codes which have these effects and, again, like the owners of dot-matrix printers, you should be able to send commands embedded in text with the use of graphics characters. Do not despair just because the printer

```
CODE NO. 142 has this  t o  s a y  f o r  i t s e l f .
CODE NO. 143 has this  to say for itself.
CODE NO. 144 has this ♥ to say for itself.
CODE NO. 145 has this ♦ to say for itself.
CODE NO. 146 has this  to say for itself.
CODE NO. 147 has this ♣ to say for itself.
CODE NO. 148 has this  to say for itself.
CODE NO. 149 has this ┐ to say for itself.
CODE NO. 150 has this ├ to say for itself.
CODE NO. 151 has this ┤ to say for itself.
CODE NO. 152 has this ┬ to say for itself.
CODE NO. 153 has this └ to say for itself.
CODE NO. 154 has this ┘ to say for itself.
CODE NO. 155 has this to say for itself.
CODE NO. 156 has this | to say for itself.
CODE NO. 157 has this — to say for itself.
CODE NO. 158 has this ┴ to say for itself.
CODE NO. 159 has this + to say for itself.
CODE NO. 160 has this   to say for itself.
CODE NO. 161 has this ' to say for itself.
CODE NO. 162 has this " to say for itself.
CODE NO. 163 has this # to say for itself.
CODE NO. 164 has this $ to say for itself.
```



Fig. 3. SHINWA printer.

manual has no information, or even if the manual gives the useful codes as very low ones, such as 10 or 13. Normally, you can add 128 on to these codes, bringing them within the range used by the Spectrum for its graphics and these should still work, even though not mentioned in the manual. In other words, chr$ 10 will give the Line Feed command but you cannot embed that in text, add 128, that gives chr$ 138 which is also a Line Feed command accepted by most printers and on the Spectrum it is supplied by graphics shifted 5.

If the command needs ESC first, then that can be supplied for daisywheel printers, too, by typing graphics one, followed by the appropriate code letter or number. This should open up a whole gamut of commands for your printer — changing pitch, changing vertical movement size, tabs vertical and horizontal, margin positions and whatever else your machine is capable of. If the printer manual isn't helpful, then try the programs that accompany this article. You may discover something useful, and at worst you'll do no harm to your printer or to the Spectrum.

Of course, it may well be that you do most of your printing through the medium of a word-processing package such as the superb TASWORD TWO which provides keyboard selection of most of the functions we've been speaking about. But there will be times when a package like this cannot cope with your printing needs and the Spectrum's secret codes will come into their own. For example, TASWORD can't print a £ sign with my printer and it cannot give a print-out of more than 64 characters per line. It can't drop into dot graphics. It can't use TAB positions, backspace, overprint or accept a loop instruction to print out several copies. All of these can be provided by the Spectrum/printer combination without word-processor software. There is a disadvantage — your screen gives you little idea of what the printer will do. When do you reach the end of a line, for example? Fig.4 provides a very basic program which will overcome the problem. It allows you to select the length of line you need and it will then provide a New Line command whenever necessary with the added bonus that it won't cut a word in two. If the last word in the line is too long, the program will shift it to the next line instead. All the "secret" codes are available, including Line Feed if you want to over-ride the program.

Finally, if you have tried all these suggestions and are still seeking excitement, try using all the GREEN and RED keywords on the keyboard as printer commands. Most of them will have some effect, often duplicating other functions. Try this:

LPRINT

Yes, that's all; no inverted commas or anything. You'll probably be quite surprised — and see all sorts of uses for it! And if you still need a £ sign to operate on TASWORD, you could reprogram one of the graphics keys, as TASWORD allows you to do under option g, with code 129 or code 35. Of course, you'll lose the function already provided by that key, but decide which one you can best do without.



VENTURESPEAK

Alan Davis puts the finishing touches to his Venturespeak Editor

The story so far:

You are in your living room. You can see a ZX Spectrum, several copies of ZX Computing Monthly, and a large chunk of VENTURESPEAK machine code saved on tape. What now?
WRITE ADVENTURE
You can't do that.
EXAMINE TAPE
There's something missing.
HELP
You need the VENTURESPEAK editor . . .

Indeed you do, and here it is. Type in Listing 1 and save it to tape with **SAVE "EDITOR" LINE 1.** Rewind the tape and verify, and then stop the tape at that point — we need to save the code from the previous articles immediately after the editor program so that it can be loaded automatically (see Line 4 of Listing 1). To do this, enter **CLEAR 59999** as a direct command, load in the 1150 bytes you stashed away last month, and save it directly after the EDITOR program with **SAVE "V-SPEAK" CODE 60000,1150.**

All set? OK — rewind the tape, type **LOAD""**, and wait for the whole thing to load in. You should then be greeted on screen with the main menu, which should look like Figure 1(a). It does? So far, so good. Press "1" to select the "Edit verbs" option, and you should get a screen looking like Figure 1(b) — except that of course none of the verbs will be there since you haven't put any in yet! Press ENTER, and you'll be asked to type in a verb — reply with the verb TELL. Then you'll be asked to type in the number of this verb — respond with the number 1. Hey Presto: the entry TEL # 1 will appear on screen, with the cursor automatically moving down a line ready for your next input (Remember that all words are truncated to their first three letters, regardless of how many you actually type in).

Try entering other verbs in the same way — use Figures 1(b) and1(c) as a guide, if you like — and notice how the editor looks after you when you reach the bottom of the screen by clearing "Page 0" and starting afresh at the top of "Page 1". "Ah yes," you say. "That's all very well, but I happened to make a mistake on Page 0. What can I do about that?" Have no fear. At any stage you can add new entries, or change existing entries, by skipping through them using the 5, 6, 7 and 8 keys. Use keys 5 and 8 to change pages (5 decreases page number while 8 increases it), and use keys 6 and 7 to move the cursor up and down the list. Position the cursor at the entry you want to change, press ENTER, and type in the amendment. The old entry will be deleted, and the new one inserted in its place. If you want to delete an entry completely, without replacement, just type a space when the program prompts you to enter a verb. It's probably obvious (but I'll say it anyway), that since entries are always inserted at the current cursor position, you'll need to skip through to the end of the file to make new additions after making an amendment — or if you prefer, you can return to the main menu and select option "1" again, when the program will automatically position the cursor at the end of the file for you.

Verbs

This is a good place to remind you that verbs related to speech, such as TELL, SAY or ASK, must be assigned the number 1. Apart from this you can allocate any number up to 254 to any verb (allocating the same number to synonyms, of course). The order in which they occur in the list is

Listing 1 — The Editor Program.

```
   1 REM ************************
        VENTURESPEAK EDITOR
        ************************
   2 REM
   3 REM
   4 CLEAR 59999: LOAD ""CODE
   5 DEF FN h(x)=INT (x/256): DEF FN l(x)=x-256*FN h(x)
  10 LET max=201: LET next=0: DIM v$(max,18)
  20 LET v$(max,1 TO 9)="000000000"
 997 REM
 998 REM *** MAIN MENU ***
 999 REM
1000 POKE 23658,8: CLS : PRINT AT 8,12;"SELECT:"''"1: Edit verbs"'"2: Edit objects"'"3: Edit people"'"4: POKE vocabulary into memory"'"5: Save vocab. array to tape"'"6: Load vocab. array from tape"'"7: Hard copy of vocabulary"'"8: Test Venturespeak system"
1010 LET n$="   ": PAUSE 0: LET y$=INKEY$: IF y$<"1" OR y$>"8" THEN GO TO 1010
1015 IF y$>"3" THEN CLS : GO SUB 3000+500*VAL y$: GO TO 1000
1017 REM
1018 REM *** EDIT VOCABULARY ***
1019 REM
1020 LET w=3*VAL y$-2: LET n=9+w: LET next=VAL v$(max,w TO w+2)+(1 AND next<(max-1)): LET this=next: LET page=INT ((next-1)/20): LET pos=next-20*page
1030 CLS : PRINT PAPER 5;AT 0,9;"WORD   NO.": PRINT AT 10,25;"Page ";page;AT 8,25;("VERBS" AND w=1)+("OBJECTS" AND w=4)+("PEOPLE" AND w=7): FOR i=1 TO 20: PRINT AT i,10;v$(page*20+i,w TO w+2);TAB 15;v$(page*20+i,n TO n+2)
1035 NEXT I
1040 GO SUB 2000
1050 BEEP .05,30: PRINT AT pos,7;">>";AT pos,19;"<<"
1060 PAUSE 0: LET i$=INKEY$
1070 IF i$="6" OR i$="7" THEN PRINT AT pos,7;"  ";AT pos,19;"  ": LET pos=pos+(1 AND i$="6" AND pos<20 AND pos<(next-page*20))-(1 AND i$="7" AND pos>1)
1080 IF i$="8" OR i$="5" THEN LET page=page+(1 AND i$="8" AND page<INT ((next-1)/20))-(1 AND i$="5" AND page<>0): LET pos=1: GO TO 1030
1090 IF i$="Q" THEN GO TO 1000
1100 IF i$=CHR$ 13 THEN GO SUB 3000: IF pos=21 OR n$(3)=" " THEN GO SUB 2500: GO TO 1020
1110 GO SUB 2000
1200 GO TO 1050
2000 PRINT PAPER 5;AT 21,0;"6=cursor up";TAB 19;"7=cursor down": PRINT #1; PAPER 5;AT 0,0;"5&8=change page";TAB 19;"q=main menu "'"ENTER=add/edit vocabulary item "
2010 RETURN
2500 LET num=VAL v$(max,w TO w+2): LET new=num: IF NOT num THEN RETURN
2510 FOR i=1 TO num
2520 IF v$(i,w)=" " THEN LET new=num-1: LET v$(i,w TO w+2)=v$(i+1,w TO w+2): LET v$(i,n TO n+2)=v$(i+1,n TO n+2): LET v$(i+1,w TO w+2)="   "
2530 NEXT i
2540 LET v$(max,w TO w+2)=STR$ new
2550 RETURN
3000 PRINT AT 21,0,,: INPUT AT 0,0;"Enter word (or SPACE to delete)"' LINE z$: IF z$="" THEN RETURN
3005 LET z$=z$+"   ": IF z$(1)=" " THEN LET n$="  ": LET x=1: GO TO 3060
3010 LET z$=z$( TO 3): PRINT AT pos,10; FLASH 1;z$
3020 INPUT AT 0,0;"Enter the number for this word"' LINE n$: LET x=LEN n$: IF x=0 OR x>3 THEN GO SUB 3500: GO TO 3020
3030 FOR i=1 TO x
3040 IF CODE n$(i)<48 OR CODE n$(i)>57 THEN GO SUB 3500: GO TO 3020
3050 NEXT i
3055 IF VAL n$>254 OR NOT VAL n$ THEN GO SUB 3500: GO TO 3020
3060 LET n$=(" " AND x<3)+(" " AND x<2)+n$: PRINT AT pos,10;z$;AT pos,15;n$
3070 LET this=pos+page*20: LET v$(this,w TO w+2)=z$: LET v$(this,n TO n+2)=n$
3080 IF this=next THEN LET v$(max,w TO w+2)=STR$ next: LET next=next+1
3090 PRINT AT pos,7;"  ";AT pos,19;"  ": LET pos=pos+(1 AND pos<21): RETURN
3500 PRINT #1; FLASH 1;AT 0,0;"NOT A VALID NUMBER": PAUSE 200: RETURN
4997 REM
4998 REM ** POKE VOCABULARY INTO
            MEMORY AND MODIFY
            MAIN PARSER CODE
4999 REM
5000 PRINT AT 5,4;"POKEing vocabulary bytes": LET vocad=61133: LET addr=61150
5007 REM
5008 REM *** POKE SINGLE LETTER
             VERBS
5009 REM
5010 GO SUB 5400
5020 LET w=1: LET n=9+w: FOR j=1 TO VAL v$(max,1 TO 3)
5030 IF v$(j,w+1 TO w+2)="  " THEN POKE addr,VAL v$(j,n TO n+2): GO SUB 5300: POKE addr,CODE v$(j,w): GO SUB 5300
5040 NEXT j: POKE addr,255: GO SUB 5300
5047 REM
5048 REM *** POKE DOUBLE LETTER
             VERBS
5049 REM
5050 GO SUB 5400: FOR j=1 TO VAL v$(max,w TO w+2)
5060 IF v$(j,w+1)<>" " AND v$(j,w+2)=" " THEN POKE addr,VAL v$(j,n TO n+2): GO SUB 5300: POKE addr,CODE v$(j,w): GO SUB 5300: POKE addr,CODE v$(j,w+1): GO SUB 5300
5070 NEXT j: POKE addr,255: GO SUB 5300
5077 REM
5078 REM *** POKE THREE-LETTER
             VERBS
5079 REM
5080 GO SUB 5400: FOR j=1 TO VAL v$(max,w TO w+2)
5090 IF v$(j,w+2)<>" " THEN POKE addr,VAL v$(j,n TO n+2): GO SUB 5300: POKE addr,CODE v$(j,w): GO SUB 5300: POKE addr,CODE v$(j,w+1): GO SUB 5300: POKE addr,CODE v$(j,w+2): GO SUB 5300
5100 NEXT j: POKE addr,255: GO SUB 5300
5107 REM
5108 REM *** POKE OBJECTS
5109 REM
5110 LET w=4: LET n=w+9
5120 GO SUB 5400: FOR j=1 TO VAL v$(max,w TO w+2)
5130 POKE addr,VAL v$(j,n TO n+2): GO SUB 5300: POKE addr,CODE v$(j,w): GO SUB 5300: POKE addr,CODE v$(j,w+1): GO SUB 5300: POKE addr,CODE v$(j,w+2): GO SUB 5300
5140 NEXT j: POKE addr,255: GO SUB 5300
5147 REM
5148 REM *** POKE PEOPLE
5149 REM
5150 LET w=7: LET n=w+9
5160 GO SUB 5400: FOR j=1 TO VAL v$(max,w TO w+2)
5170 POKE addr,VAL v$(j,n TO n+2): GO SUB 5300: POKE addr,CODE v$(j,w): GO SUB 5300: POKE addr,CODE v$(j,w+1): GO SUB 5300: POKE addr,CODE v$(j,w+2): GO SUB 5300
5180 NEXT j: POKE addr,255: GO SUB 5300
5190 LET length=addr-60000
5200 PRINT AT 12,0;"Vocabulary stored from "'61150;" to ";addr-1;" inclusive"
5210 PRINT AT 16,0;"PRESS ""Q"" TO RETURN TO MENU OR"'"ANY OTHER KEY TO SAVE COMPLETE  PARSER PLUS VOCABULARY"'"(";length;" bytes starting at 60000)": PAUSE 0: IF INKEY$="Q" THEN RETURN
5220 SAVE "PARSER"CODE 60000,length: CLS : PRINT AT 10,4;"REWIND TAPE TO VERIFY": VERIFY "PARSER"CODE : RETURN
5300 PRINT AT 10,4;addr;AT 10,12;"   ";AT 10,12;PEEK addr: LET addr=addr+1: RETURN
5400 POKE vocad,FN l(addr): POKE vocad+1,FN h(addr): LET vocad=vocad+2: RETURN
5497 REM
5498 REM *** SAVE VOCAB ARRAY **
5499 REM
5500 INPUT "Enter the name of this array."' LINE y$: IF y$="" THEN GO TO 5500
5510 PRINT AT 10,0;"SAVING ARRAY: ";y$: SAVE y$ DATA v$()
5520 CLS : PRINT AT 10,0;"REWIND TAPE TO VERIFY": VERIFY y$ DATA v$()
5530 RETURN
5997 REM
5998 REM *** LOAD VOCAB ARRAY **
5999 REM
6000 INPUT "Name of array to be loaded?"' LINE y$: IF LEN y$>10 THEN GO TO 6000
6010 PRINT AT 10,0;"LOADING: ";y$''"START THE TAPE.": LOAD y$ DATA v$()
6020 RETURN
6497 REM
6498 REM *** HARD COPY OF VOCAB
6499 REM
6500 FOR i=1 TO 3: LET w=3*i-2: LET n=9+w
6510 LET num=VAL v$(max,w TO w+2)
6520 LPRINT ''("VERBS" AND i=1);("OBJECTS" AND i=2);("PEOPLE" AND i=3): LPRINT
6530 FOR j=1 TO num: LPRINT v$(j,w TO w+2);TAB 6;v$(j,n TO n+2)
6540 NEXT j: NEXT i: RETURN
6997 REM
6998 REM *** TEST VENTURESPEAK
             SYSTEM
6999 REM
7000 LET sum=0: FOR i=61133 TO 61143: LET sum=sum+PEEK i: IF NOT sum THEN PRINT #1;AT 0,4; FLASH 1;"VOCABULARY NOT IN SYSTEM!": PAUSE 200: RETURN
7010 PRINT AT 2,3;"TYPE IN YOUR TEST SENTENCE."
7020 LET m=USR 60000: IF NOT PEEK 60383 THEN LET m=USR 3582: PRINT AT 21,5;"Time passes": LET m=USR 3582: GO TO 7020
7030 LET m=USR 60400
7040 CLS : PRINT AT 1,0;: FOR i=60318 TO 60317+PEEK 60315: PRINT PAPER 6;CHR$ PEEK i;: NEXT i: PRINT AT 6,5;"COMMAND ANALYSIS": LET tell=PEEK 61124: PRINT AT 10,5;"TELL:",tell
7050 LET pers=PEEK 61125: PRINT AT 11,5;"PERS:",pers
7060 LET vb1=PEEK 61126: PRINT AT 13,5;"VB1  :",vb1
7070 LET vb2=PEEK 61127: PRINT AT 14,5;"VB2  :",vb2
7080 LET fk1=PEEK 61129: PRINT AT 16,5;"FK1  :",fk1
7090 LET ob1=PEEK 61131: PRINT AT 18,5;"OB1  :",ob1
7100 LET ob2=PEEK 61132: PRINT AT 19,5;"OB2  :",ob2
7110 IF PEEK 61123 THEN PRINT #1; FLASH 1;AT 0,4;"ANOTHER COMMAND FOLLOWS": PAUSE 0: LET m=USR 60426: GO TO 7040
7120 PRINT #1;AT 0,0;"""Q"" TO return to menu"'"Any other key to try again": PAUSE 0: CLS : IF INKEY$="Q" THEN RETURN
7130 GO TO 7000
```

quite irrelevant. I should also point out that any abbreviation you'd like the parser to accept (such as "N" for "NORTH") must be entered separately as a synonym in its own right — there are plenty of examples of this in Figures 1(b) and 1(c).

Once you've become used to the editing system, press "q" to return to the main menu, and try selecting options 2 and 3. You'll find that the method of adding entries to the "people" and "objects" vocabulary files is just the same; the program asks you first for the word, then for its number, whenever you press ENTER. Easy, isn't it? Don't worry about making illegal entries by mistake — the editor is very extensively error-trapped, and it should be virtually impossible to crash it by accident.

What about those other options on the main menu? Option 4 ("POKE vocabulary") does require a little explanation. You see, in any of the 3 "Edit" modes, all you're actually doing is manipulating the contents of a *temporary* file — in fact it's a BASIC array,v$(). When you're happy that all the vocabulary you need has been added, selecting option 4 causes the editor to POKE your vocabulary into memory above RAMTOP,

Figure 1 — sample screens from the editor.

1(A) Main Menu.

```
                  SELECT:

1: Edit verbs
2: Edit objects
3: Edit people
4: POKE vocabulary into memory
5: Save vocab. array to tape
6: Load vocab. array from tape
7: Hard copy of vocabulary
8: Test Venturespeak system
```

1(B) Verbs Editor, Page 0.

```
          WORD    NO.
          SAY     1
          TEL     1
          ASK     1
          TAL     1
          L       2
          LOO     2
          N       3
          NOR     3              VERBS
          S       4
       >> SOU     4  <<          Page 0
          E       5
          EAS     5
          W       6
          WES     6
          IN      7
          ENT     7
          OUT     8
          LEA     8
          U       9
          UP      9
6=cursor up              7=cursor down
5&8=change page          q=main menu
ENTER=add/edit vocabulary item
```

1(C) Verbs Editor, Page 1.

```
          WORD    NO.
          CLI     9
          ASC     9
          D       10
          DOW     10
          DES     10
          GET     11
          TAK     11
          PIC     11             VERBS
          DRO     12
          PUT     12             Page 1
          EXA     13
          REA     13
          GIV     14
          OFF     14
          FIG     15
          KIL     15
          ATT     15
          HIT     15
       >>            <<
6=cursor up              7=cursor down
5&8=change page          q=main menu
ENTER=add/edit vocabulary item
```

1(D) Generator of parser code with vocabulary.

```
     POKEing vocabulary bytes



     61354     255

Vocabulary stored from
61150 to 61354 inclusive

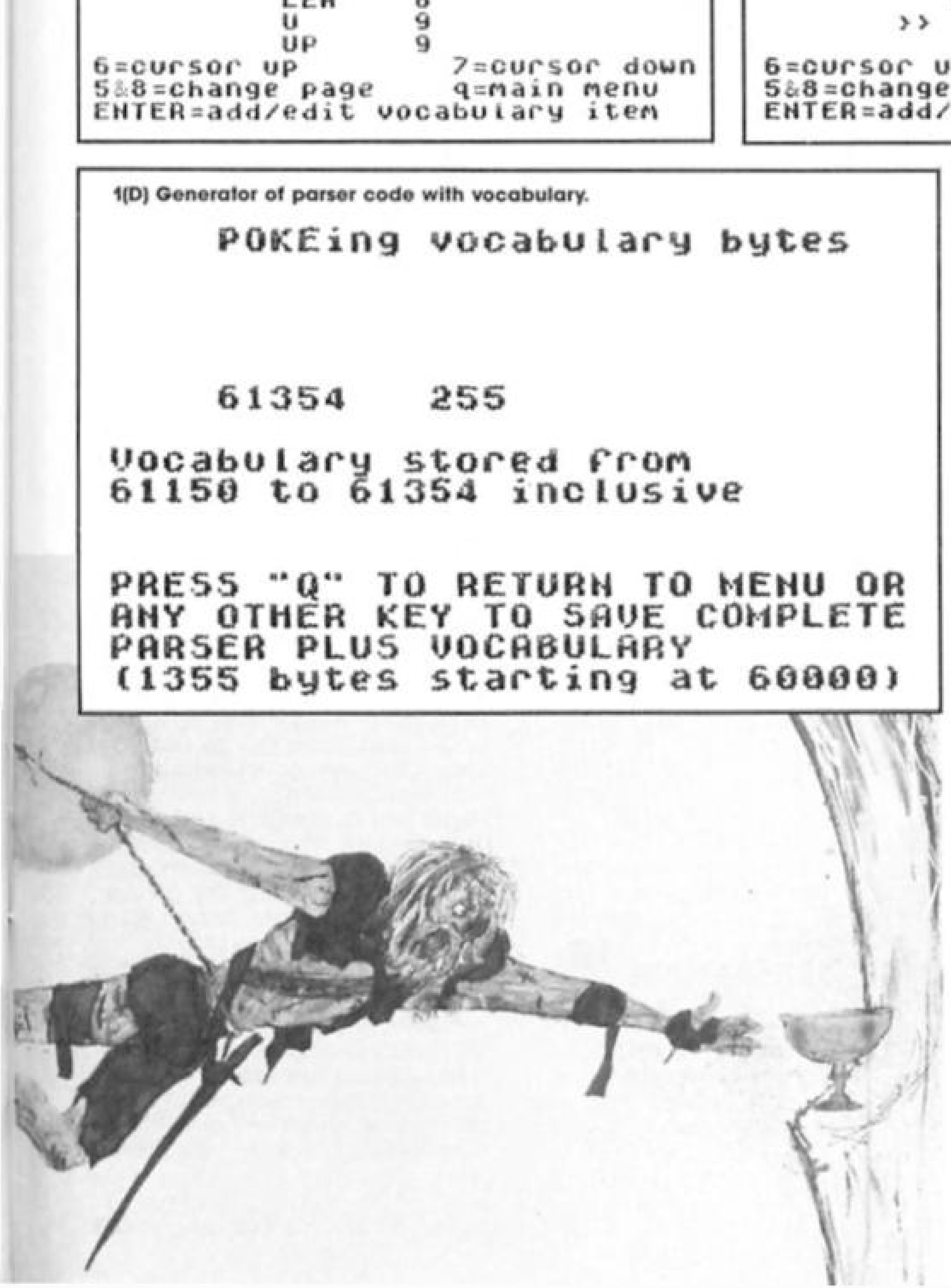

PRESS "Q" TO RETURN TO MENU OR
ANY OTHER KEY TO SAVE COMPLETE
PARSER PLUS VOCABULARY
(1355 bytes starting at 60000)
```

making the appropriate modifications to the VENTURESPEAK machine code as necessary. Once this is finished, the program will offer to save the complete parser code (including vocabulary) to tape, informing you where in memory it resided, and how long it it. (See Figure 1(d)). This is the final chunk of code which you'll subsequently incorporate into your adventure.

Files

Options 5 and 6 on the main menu improve the versatility of the editor program, allowing you to save and load the *temporary* vocabulary file, v$(), to and from tape. Suppose, for example, that you've just spent a session entering vocabulary, but wish to stop and continue some other time. All you need to do is save what you've done so far using option 5 and then load it back into the editor at the start of your next session, using option 6. Actually, I strongly recommend that you save the temporary file as well as the completed code even when you think you've finished, just as a matter of course. The reason for this is that when you come to play-test your adventure game eventually, you're almost certain to want to make additions or modifications to the vocabulary at some stage — and there's no way of modifying the code itself from within the editor. However, if you've saved the temporary array there's no problem. Just load it into the editor using option 6, make your amendments, and then generate a fresh batch of code (using option 4) to replace the old one.

Of the other options on the



main menu, number 7 is self-explanatory. This gives you a hard copy of the entire vocabulary file for future reference. The only comment worth making here is that the print-out is produced from the temporary file v$(), rather than from the finished code — so you can get hard copy whether or not you've previously used option 4 to POKE in the vocabulary.

The last option, number 8, allows you to test the command analysis system *in situ*, but note that the editor won't let you try this unless you've first POKEd in the vocabulary by using option 4. I went into details of the method of command analysis last month, and now you can try out some of those examples for yourself using this facility. Just type in your command when you see the little "prompt" symbol, and the system will do a complete analysis for you.

There are one or two other points I should make about the editor itself. With the program as written, each of the three vocabulary files can hold up to 200 entries — giving you a maximum vocabulary of 600 words. This will almost certainly give you adequate scope — and increasing the limit needlessly will merely increase saving and loading times for the temporary array. However, there's nothing to stop you increasing the limit if you wish to do so; you simply need to change the value assigned to the variable "max" in line 10 of listing 1. It should be assigned a value of (1 + some multiple of 20); **LET max = 401,** for instance, will give you scope for up to 400 entries in each file. One further point about the editor is that you can use the POKE vocabulary option as many times as you like within a session; it will just overwrite whatever went before.

Now that you have the editor, you're in the happy position of being able to produce a machine code parser for any adventure you care to write — but a few tips about incorporating it into a BASIC adventure program may not go amiss. You'll need to CLEAR 59999, of course, so that your parser can be safely loaded in at address 60000. If you've written adventures in BASIC already then you should have no problems, but I've given in Listing 2 a suggested outline structure (it is no more than a mere outline) which you might find helpful. The significance of the various symbols was explained in last month's article. Essentially the purpose of the parser is to translate an English sentence into a series of numbers on which condition tests can be performed, and of course the use you make of it lies entirely in your own hands. Nevertheless, there are methods of working which lend themselves well to the VENTURESPEAK system.

Listing 2 — outline structure for adventure command analysis.

```
  10 REM *SUGGESTED OUTLINE
         STRUCTURE FOR REAL
         TIME ADVENTURE
  11 REM
  12 REM
 197 REM
 198 REM *AWAIT INPUT
         (MAIN LOOP STARTS HERE)
 199 REM
 200 LET m=USR 60000: IF NOT PEE
K 60383 THEN GO SUB 1000: GO TO
200
 207 REM
 208 REM *DECODE COMMAND
 209 REM
 210 LET m=USR 60400
 217 REM
 218 REM *ALLOCATE COMMAND
         VARIABLES
 219 REM
 220 LET tell=PEEK 61124
 221 LET pers=PEEK 61125
 222 LET vb1=PEEK 61126
 223 LET vb2=PEEK 61127
 224 LET fk1=PEEK 61129
 225 LET ob1=PEEK 61131
 226 LET ob2=PEEK 61132
 227 LET more=PEEK 61123
 230 IF NOT tell OR NOT vb1 THEN
GO SUB 300: GO TO 200
 237 REM
 238 REM *CONVERSATION?
 239 REM
 240 IF tell THEN GO SUB 2000
 247 REM
 248 REM *CALL APPROPRIATE
         SUBROUTINE FOR MAIN
         VERB (VB1)
 249 REM
 250 GO SUB 1900+100*vb1
 257 REM
 258 REM *CALL INDEPENDENT
         ACTION SUBROUTINE
 259 REM
 260 GO SUB 1000
 267 REM
 268 REM *CONTINUE ANALYSIS IF
         A MULTIPLE COMMAND
 269 REM
 270 IF more THEN LET m=USR 6042
6: GO TO 210
 277 REM
 278 REM *RETURN FOR ANOTHER
         INPUT
 279 REM
 280 GO TO 200
 300 REM *PRINT MESSAGE FOR VERB
         NOT UNDERSTOOD*
 310 RETURN
1000 REM *INDEPENDENT ACTION
         ROUTINES IF REQUIRED
1099 RETURN
2000 REM *CONVERSATION ROUTINES
2099 RETURN
2100 REM .*TEST CONDITIONS FOR
         VERB NO.2 AND CARRY
         OUT COMMAND IF VALID
2199 RETURN
2200 REM *TEST CONDITIONS FOR
         VERB NO.3 AND CARRY
         OUT COMMAND IF VALID
2299 RETURN
2300 REM *AND SO ON FOR VERB 4,
         VERB 5, VERB 6 ETC..
```

Objects

For instance, one sensible approach might be to store all your subject descriptions in a series of DATA statements in exactly the same order as they appear in the vocabulary file. Thus we might have lines such as:

9001 DATA "bright sword"
9002 DATA "sharp dagger"
9003 DATA "long spear"
9004 DATA "large chest"
etc.

You'd then arrange your vocabulary so that 'SWO" is assigned the number 1, "DAG" the number 2, "SPE" the number 3, and "CHE" the number 4. In this way, values of ob1 and ob2 extracted from the parser can be related directly to specific data items for printing messages. Thus a command like "PUT THE SWORD IN THE CHEST" when analysed would give ob1 = 1 and ob2 = 4. Then in your "putting" subroutine you'd have a line like: **RESTORE (9000 =ob1): READ x$: RESTORE (9000 + ob2): READ y$: PRINT "You put the";x$;"in the";y$;"."** This would produce the message "You put the bright sword in the large chest. — assuming of course that the necessary logical tests have been satisfied.

You can use similar tricks for dealing with more complex commands involving other characters. Thus you might list characters' names in a second set of DATA statements, eg

8001 DATA "Sam"
8002 DATA "Fred" etc

ensuring that SAM is allocated the number 1 in the "people" vocabulary file, and FRE(D) the number 2. A command such as "ASK SAM TO GIVE THE SWORD TO FRED" can then be conveniently streamlined. The analysis would give tell = 1, pers = 1, fkl = 2, ob1 = 1, and vbl = whatever number you assigned to the verb "GIVE". In the speech subroutine, after the appropriate checks to ensure that Sam is indeed present, you'd have a line like: RESTORE (8000 + pers): READ p$: PRINT "You talk to";p$;"." Subsequently vb1 is inspected, resulting in the "giving" subroutine being called. Here would be another series of condition tests (Is the object available for giving? Is fkl — Fred — present?) leading ultimately to a line like this: RESTORE (9000 + ob1): READ x$: RESTORE (8000 + fk1): READ y$: LET p$ = (p$ AND tell) + ("You AND NOT tell): PRINT p$;"give";"s" AND tell;" the ";x$;" to ";y$;"." In this particular example you'd then see on screen the message:"You talk to Sam. Sam gives the bright sword to Fred." Of course you could embellish this as much as you like — writing convincing conversation routines is an important part of the fun! Notice that the line suggested above will deal with the situation no matter who is doing the giving; if the variable "tell" is zero, you'd just get:"You give the bright sword to Fred".

So there you are. the VENTURESPEAK parser is at your disposal. For the rest — the creation of that wonderful adventure which will outshine "Sherlock" — over to you...

Ray Elder presents a complete game plus news from the last bastion of the ZX81.

This month we have a couple of contacts for all of you who are holding fast to the joys of ZX81ing, and the first is from that established and tenuous company Arctan Computer Ventures who are probably best known fro their MATRE '81/2 and Disassembler programs.

They sent us a four page typed 'catalogue' of their wares which includes the aforementioned progs plus a copy of thier double game tape called Fireman Jamie & Hefalump at £4.50.

I had a look at it and although lacking in sophistication when compared with the state of the art games around for other machines it nevertheless proved to be an enjoyable and very playable game for the old Sinclair Dinosaur.

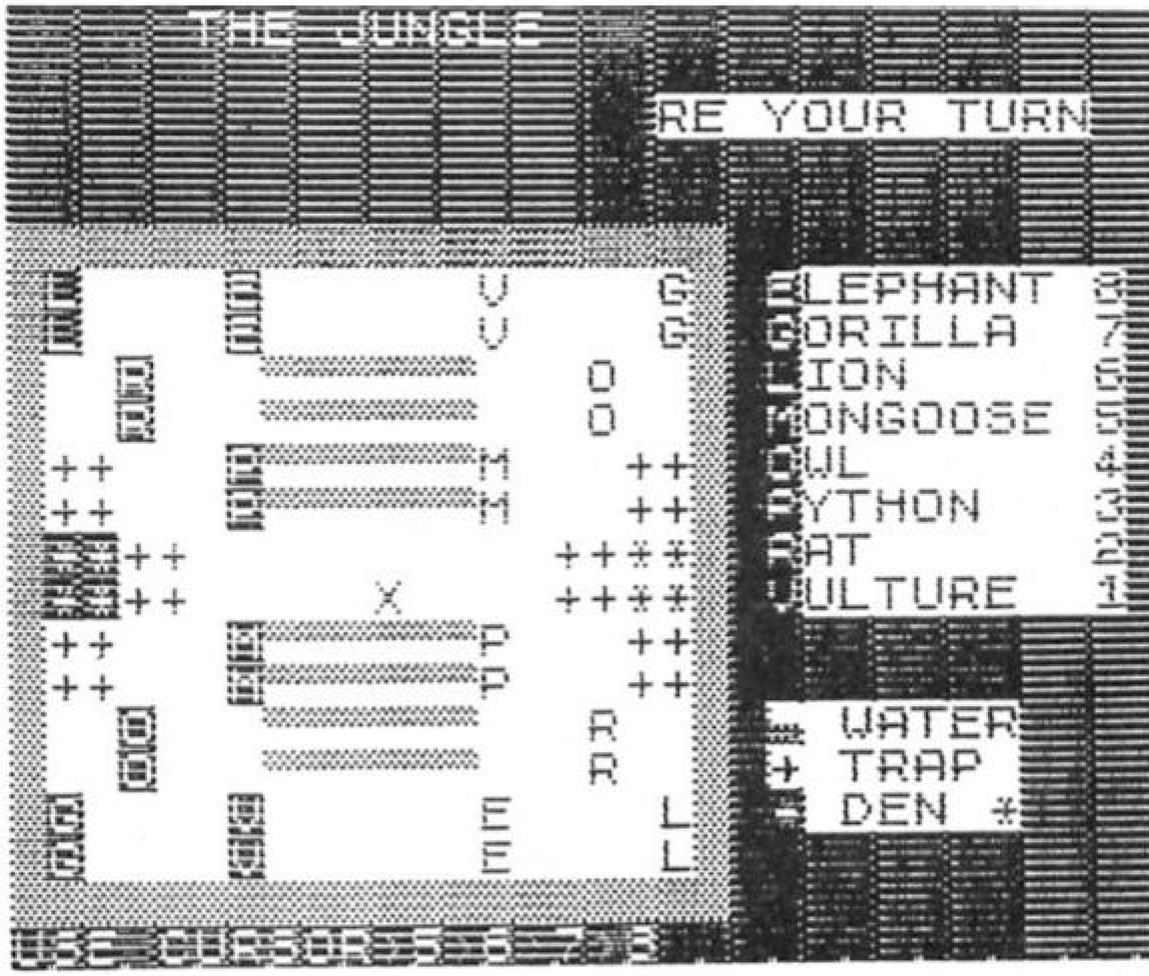
ACV also run a ZX81 club called AZUC (Arctan ZX81 Users Club) which is good news for any of you deprived 81'ers. To obtain more details, contact them at 1 Foxwell Square, Southfields, Northampton, NN3 5AT.

And theres more...

Two enterprising chaps from Scotland have produced two games for the old 81, both featuring the Hi-Res type screens that had been starting to appear before most companies deserted to the Speccy.

Roch Crush and Dan's Revenge are both caverns/collect and dodge games and are very similar all round, the packaging is cheap but the games themselves are quite enjoyable. At the height of the ZX81's life they would have rated as average but now in the present climate of total decline they are unique.

Recommended to all 81'ers and it may be worth sending any possible games for



Listing 1

```
   1 LET G=1+PEEK 16396+256*PEEK
 16397
   2 LET H=G+10+13+33
   3 DIM M(1)
   4 LET Z=0
   5 DIM A$(1,1)
   6 DIM B$(1,1)
  10 LET T=0
  11 GOTO 2000
  12 FOR A=0 TO 21
  13 PRINT AT A,0;"
                              "
  14 NEXT A
  15 PRINT AT 10,0;"FULL GAME";A
T 11,5;"........PRESS F";AT 14,0;
"GAME IN PROGRESS";AT 15,5;"....
....PRESS P"
  16 LET A$(1)=INKEY$
  17 IF A$(1)="F" OR A$(1)="P" T
HEN GOTO 19
  18 GOTO 16
  25 PRINT AT 0,5;"THE JUNGLE"
  30 PRINT AT 5,0;"
       ";AT 20,0;"
       "
  31 FOR A=6 TO 19
  32 PRINT AT A,0;"
     "
  33 NEXT A
  35 IF A$(1)="P" THEN GOTO 57
  54 PRINT AT 6,1;"L    E      V
    G";AT 7,1;"L    E      V
G";AT 8,3;"E              O";AT 9,
3;"E              O";AT 10,1;"++
 P         M     ++";AT 11,1;"++      P
           M     ++";AT 12,1;"  ++
++++"
  55 PRINT AT 13,1;"  ++
++++";AT 14,1;"++          M      P
++";AT 15,1;"++     M      P    ++
";AT 16,3;"E               R";AT 17
,3;"E               R";AT 18,1;"G
U       E     L";AT 19,1;"G       U
       E     L"
  56 GOTO 60
  57 PRINT AT 6,3;"   G";AT 7,6;
"   RPP";AT 8,6;"          O";AT
 9,7;"            V";AT 10,1;"++
                   ++";AT 11,1;"++
        L G ++";AT 12,1;"  ++  G
++++"
  59 PRINT AT 13,1;"  ++  G
++++";AT 14,1;"++            L
++";AT 15,1;"++                ++
";AT 16,5;"            V";AT 17,6;
"R          O";AT 18,6;"  ";AT 19,8;
"L   MEM"
  60 PRINT AT 6,21;"ELEPHANT 8"
  61 PRINT AT 7,21;"GORILLA  7"
  62 PRINT AT 8,21;"LION     6"
  63 PRINT AT 9,21;"MONGOOSE 5"
  64 PRINT AT 10,21;"GUL      4"
  65 PRINT AT 11,21;"PYTHON   3"
  66 PRINT AT 12,21;"RAT      2"
  67 PRINT AT 13,21;"VULTURE  1"
  69 PRINT AT 16,21;"  WATER"
  70 PRINT AT 17,21;"+ TRAP "
  71 PRINT AT 18,21;"  DEN *"
```

▶ ▶ ▶

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ZX81 PROGRAMMING

```
 100 GOTO 2500
 110 CLS
 111 LET Z=1
 115 PRINT AT 8,2;"ENTER INITIAL
S OF 1ST PLAYER";AT 9,17;"(3 LET
TERS MAX)"
 120 INPUT C$
 121 IF LEN C$>3 THEN GOTO 120
 122 PRINT AT 12,10;C$;AT 21,10;
"CORRECT? (Y/N)"
 123 GOSUB 1010
 124 IF A=0 THEN GOTO 115
 125 PRINT AT 8,20;"AND"
 126 INPUT D$
 127 IF LEN D$>3 THEN GOTO 126
 129 PRINT AT 12,20;D$;AT 21,10;
"CORRECT?"
 130 GOSUB 1010
 131 IF A=0 THEN GOTO 126
 132 LET B=1
 133 GOTO 2000
1010 IF INKEY$="N" THEN GOTO 101
8
1012 IF INKEY$="Y" THEN GOTO 102
0
1014 GOTO 1010
1018 LET A=0
1019 RETURN
1020 LET A=1
1021 RETURN
2000 FOR A=0 TO 21
2001 PRINT AT A,0;"[illegible]
[illegible]"
2004 NEXT A
2010 PRINT AT 2,14;"MENU"
2015 PRINT AT 6,6;" 1 NAME OF PL
AYERS"
2020 PRINT AT 10,6;" 2 INSTRUCTI
ONS"
2025 PRINT AT 14,6;" 3 PLAY THE
GAME"
2030 PRINT AT 18,6;" 4 STOP"
2045 IF INKEY$="1" THEN GOSUB 11
0
2050 IF INKEY$="2" THEN GOTO 900
0
2055 IF INKEY$="3" AND Z=1 THEN
GOTO 12
2060 IF INKEY$="4" THEN STOP
2061 GOTO 2045
2500 PRINT AT 2,18;C$;" YOUR TUR
N"
2501 LET G=0
2502 GOSUB 3001
2503 PRINT AT 2,18;"YOUR TURN ";
D$
2504 LET G=1
2505 GOSUB 3001
2506 GOTO 2500
3001 LET C=H
3002 POKE H,CODE "X"
3003 LET A$(1)=" "
3004 PRINT AT 21,0;"USE CURSORS 5
.6.7.8"
3005 IF INKEY$="5" OR INKEY$="6"
 OR INKEY$="7" OR INKEY$="8" THE
N GOTO 3100
3006 GOSUB 8000
3007 GOTO 3005
3009 IF INKEY$="6" THEN LET H=H+
33
3010 IF INKEY$="7" THEN LET H=H-
33
3011 LET H=H-(INKEY$="5")+(INKEY
$="8")
3012 IF PEEK H=8 THEN GOTO 3030
3014 IF A$(1)="X" THEN LET A$(1)
=B$(1)
3015 POKE C,CODE B$(1)
3016 LET E=VAL "PEEK H"
3017 LET A$(1)=CHR$ E
3021 POKE H,CODE "X"
3022 LET T=0
3023 IF G=0 AND E>=40 AND E<=69
THEN GOTO 4000
3024 IF G=1 AND E>=168 AND E<=18
9 THEN GOTO 4000
3028 GOTO 3005
3030 IF B$(1)="X" THEN LET A$(1)
=B$(1)
3031 LET H=C
3032 GOTO 3005
3100 IF T=1 THEN GOTO 3104
3103 LET B$(1)=A$(1)
3104 LET C=H
3105 GOTO 3009
4010 PRINT AT 21,0;"PIECE TO BE
MOVED?"
4011 IF INKEY$="N" THEN GOTO 401
6
4012 IF INKEY$="Y" THEN GOTO 402
0
4014 GOTO 4011
4016 PRINT AT 21,0;"[illegible]
[illegible]"
4017 GOTO 3004
4020 PRINT AT 21,0;"[illegible]
[illegible]"
4021 PRINT AT 21,0;"DIRECTION..5
.6.7.8"
4022 LET M=0
4023 IF INKEY$="7" THEN LET M=-3
3
4024 IF INKEY$="6" THEN LET M=33
4025 IF INKEY$="8" THEN LET M=1
4026 IF INKEY$="5" THEN LET M=-1
4030 IF M=0 THEN GOTO 4023
4032 PRINT AT 21,0;"[illegible]
[illegible]"
4033 LET D=H+M
4034 LET E=VAL "PEEK D"
4035 IF E<>0 THEN GOTO 4070
4037 LET B$(1)=CHR$ E
4038 POKE D,CODE A$(1)
4039 IF E=0 OR E=149 THEN RETURN

4040 LET C=VAL "PEEK D"
4042 FOR A=1 TO 15
4043 POKE D,CODE "+"
4044 POKE D,CODE " "
4045 POKE D,CODE "[graphic]"
4046 POKE D,CODE " "
4047 NEXT A
4048 IF A$(1)="R" AND B$(1)="E"
OR A$(1)="R" AND B$(1)="E" OR A$
(1)="E" AND B$(1)="R" OR A$(1)="
E" AND B$(1)="R" THEN GOTO 4057
4050 IF G=0 THEN LET E=E-128
4051 IF G=1 THEN LET C=C-128
4052 IF C>E THEN POKE D,CODE B$(
1)
4053 IF E>C THEN POKE D,CODE A$(
1)
4054 IF C=E THEN POKE D,CODE A$(
1)
4055 GOTO 4065
4057 IF C=55 OR E=55 THEN POKE D
,CODE "R"
4058 IF C=183 OR E=183 THEN POKE
 D,CODE "R"
4065 RETURN
4070 LET A=0
4071 IF E=21 THEN GOTO 4500
4072 LET A=1
4073 IF G=1 AND E>41 AND E<60 TH
EN GOTO 4037
4074 IF G=0 AND E>169 AND E<188
THEN GOTO 4037
4075 IF G=0 AND E=151 THEN GOTO
5000
4076 IF G=1 AND E=23 THEN GOTO 5
000
4090 PRINT AT 21,0;"CANT MOVE.TR
Y AGAIN (Y/N)"
4095 GOTO 4011
4500 LET I=INT (RND*6)
4501 LET E=0
4502 IF I<=2 THEN GOTO 4510
4503 IF I=3 OR I=4 THEN GOTO 452
0
4504 FOR A=0 TO 16
4505 PRINT AT 21,A;"█TRAP DESTRO
YED"
4506 NEXT A
4507 PRINT AT 21,17;"[illegible]
[illegible]"
4508 GOTO 4037
4511 POKE H,CODE A$(1)
4512 POKE D,CODE "+"
4513 LET B$(1)=A$(1)
4514 LET T=1
4515 FOR A=0 TO 11
4516 PRINT AT 21,A;"█";A$(1);" R
ETREATS FROM TRAP"
4517 NEXT A
4518 PRINT AT 21,12;"[illegible]
[illegible]"
4519 GOTO 4039
4520 POKE D,CODE "+"
4521 FOR A=0 TO 15
4522 PRINT AT 21,A;"█";A$(1);" K
ILLED IN TRAP"
4523 NEXT A
4524 PRINT AT 21,16;"[illegible]
[illegible]"
4525 GOTO 4039
5000 CLS
5001 PRINT AT 10,12;"THE WINNER"
5002 IF G=0 THEN PRINT AT 16,14;
C$
5003 IF G=1 THEN PRINT AT 16,14;
D$
5005 PRINT AT 20,0;"ANOTHER GAME
?(Y/N)"
5006 IF INKEY$="Y" THEN RUN
5007 IF INKEY$="N" THEN STOP
5008 GOTO 5006
8000 FOR U=1 TO 10E10
8001 FOR I=8 TO 11
8002 PRINT AT I,7;"[graphic]"
8003 IF INKEY$<>"" THEN RETURN
8004 NEXT I
8005 FOR I=8 TO 11
8006 PRINT AT I,7;"[graphic]"
8007 IF INKEY$<>"" THEN RETURN
8008 NEXT I
8009 FOR I=14 TO 17
8010 PRINT AT I,7;"[graphic]"
8011 IF INKEY$<>"" THEN RETURN
8012 NEXT I
8013 FOR I=14 TO 17
8016 PRINT AT I,7;"[graphic]"
8018 IF INKEY$<>"" THEN RETURN
8019 NEXT I
8020 NEXT U
9001 FOR A=0 TO 21
9002 PRINT AT A,0;"[illegible]
[illegible]"
9003 NEXT A
9005 PRINT AT 21,0;"  THIS IS A
 STRATEGICAL GAME    "
9006 SCROLL
9007 PRINT "FOR TWO PLAYERS EACH
 CONTROLLING"
9008 SCROLL
9009 PRINT "A GROUP OF ANIMALS P
ROTECTING A "
9010 SCROLL
9011 PRINT "DEN SURROUNDED BY TR
APS,        "
9012 SCROLL
9013 PRINT "  MORE POWERFUL ANI
MALS CAN EAT"
9014 SCROLL
9015 PRINT "OTHERS BY MOVING ONT
O THE SQUARE"
9016 SCROLL
9017 PRINT "OCCUPIED,HOWEVER A R
AT CAN KILL "
9018 SCROLL
9019 PRINT "AN ELEPHANT BY RUNNI
NG INTO ITS "
9020 SCROLL
9021 PRINT "EARS AND GNAWING AT
ITS BRAIN,IF"
9022 SCROLL
9023 PRINT "SIMILIAR STRENGTH AN
IMALS MEET  "
9024 SCROLL
9025 PRINT "THE STATIONARY ONE I
S EATEN,    "
9026 SCROLL
9027 PRINT "  ANY ANIMAL ENTERIN
G A TRAP    "
9028 SCROLL
9029 PRINT "MAY DESTROY IT  RETR
EAT OR BE   "
9030 SCROLL
9032 PRINT "KILLED.
            "
9034 SCROLL
9035 PRINT "   DEFENDING ANIMALS
 CANT ENTER "
9036 SCROLL
9037 PRINT "THEIR OWN DEN, AN EN
EMY ANIMAL  "
9038 SCROLL
9039 PRINT "ENTERING A DEN GIVES
 ITS SIDE   "
9040 SCROLL
9041 PRINT "VICTORY, WATER  IS I
MPASSIBLE,  "
9042 SCROLL
9043 PRINT "BLACK PLAYS LEFT TO
RIGHT,      "
9044 SCROLL
9045 PRINT "[illegible]
[illegible]"
9046 IF INKEY$="" THEN GOTO 9046
9050 GOTO 2000
```

marketing to these folks to encourage them to keep going.

Available from Scott Dolan & Steven McDonald, 22 Maysfield Place, Musselburgh, E. Lothian, Scotland. EX21 6HS

Not only but also

Steven Howlett of 24 Beacons View Rd. Clase, Morriston, Swansea, SA6 7HJ writes to inform us of their club for 81'ers called the Computer Games Club and are offering a free games tape to new members.

We know nothing about them except for the letter which looks as if it was produced on a ZX printer by a Speccy running Tasword 2, and that they intend to keep users updated with the programs available, so drop 'em a line.

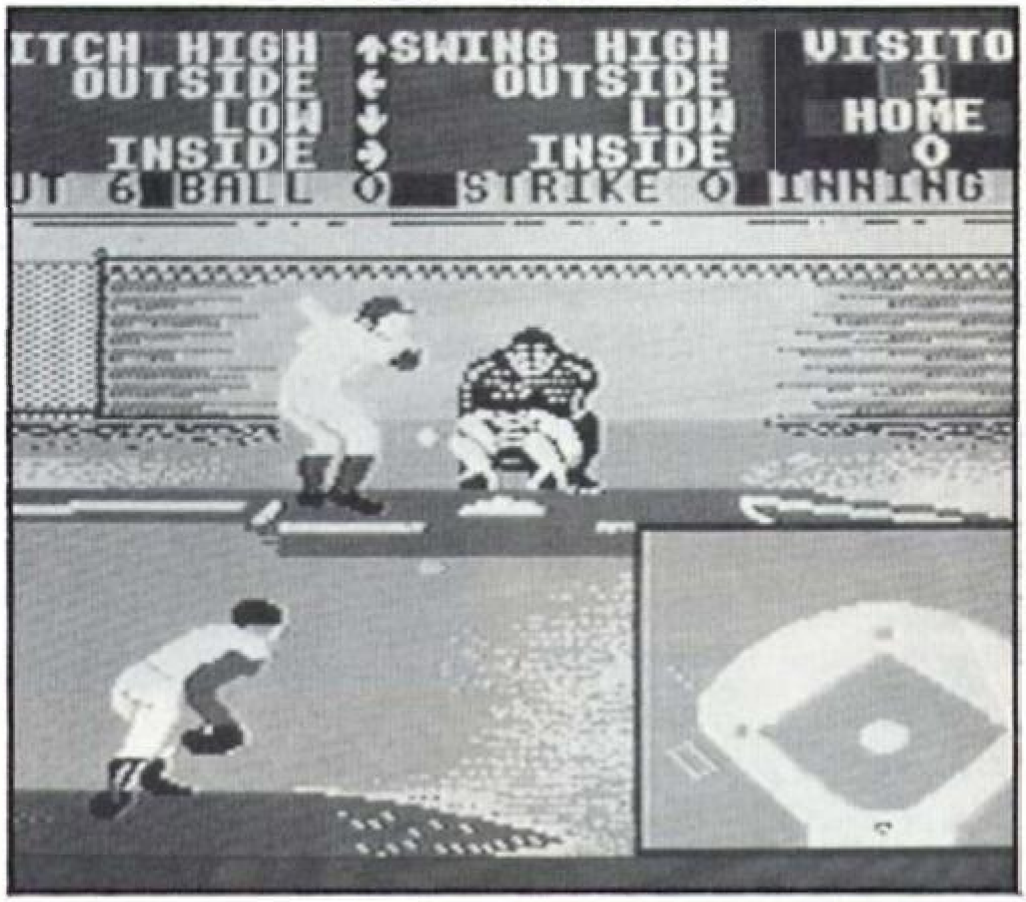
And finally

This month's program is a rather long (for our page) strategy/board game which should keep your fingers busy as you type it in until next month. It was programmed by Kevin Wright of Axminster and full instructions are included.

I like it!!!!!

If watching the televised Baseball World Series has whetted your appetite for the real thing here's your chance to win the essential hardware.

STRIKE LUCKY



COMPETITION

In conjunction with Advance Software, ZX is giving five readers the opportunity to get equipped for baseball action. There are five sets of a baseball bat, catcher's glove and hardball up for grabs in this competition that should prove a cinch for baseball aficionados.

All you have to do is answer the three questions below and fill out the coupon on this page. Please remember to put our answers on the outside of your envelope. But if the idea of all this strenuous exercise (playing baseball, not filling in the coupon) doesn't appeal, there is always Advance Software's Monster Hit rated Baseball simulation, Hardball, for armchair athletes.



The Questions

1.) New York has two famous baseball teams. One is the New York Mets. Can you name the other one?
2.) Which two teams contested the 1986 Baseball World Series?
3.) Film star Marilyn Monroe married a legendary American Baseball player. Can you name him?

The competition is open to all readers of ZX except employees of Argus Specialist Publications, Advance Software and Chase Web. The editor's decision is final and no correspondence can be entered into.

Send your entries to Hardball Competition, ZX Computing Monthly, No 1 Golden Square, London W1R 3AB. The closing date is January 9th 1987.

Hardball Competition The answers to the questions are

1. ....

2. ....

3. ....

Name: ....

Address: ....

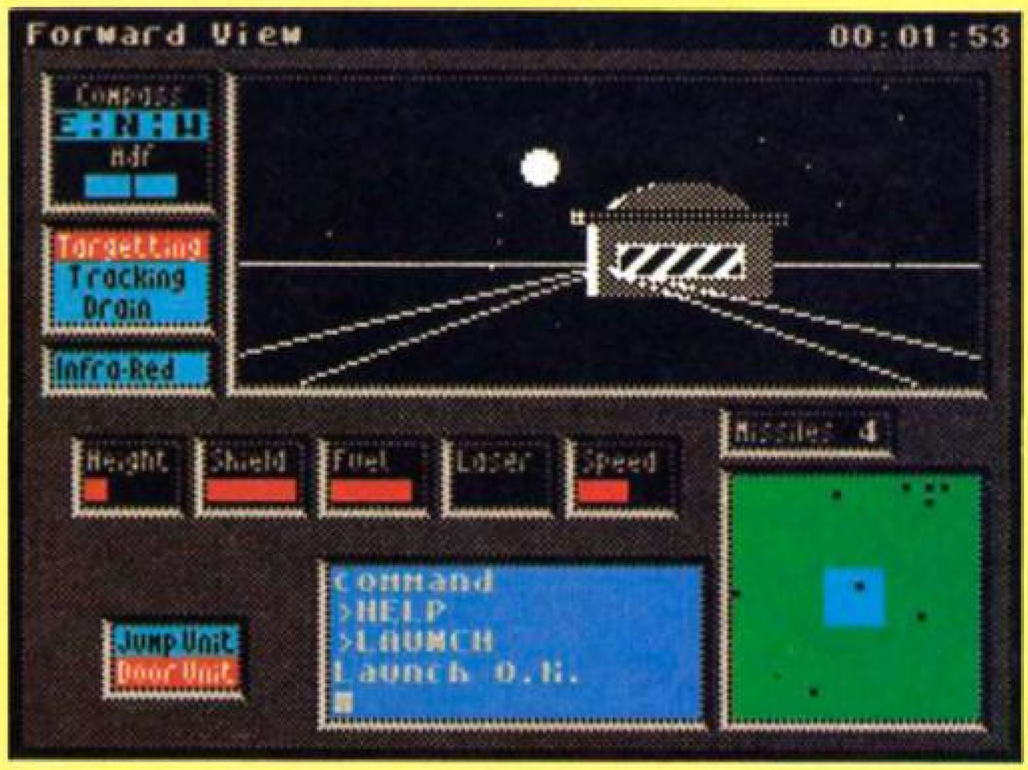
....

....

Send to Hardball Competition, ZX Computing Monthly, No 1 Golden Square, London W1R 3AB.

Welcome to

With so many games now being created by teams, the solo programmer is becoming a rarity. ZX sought out Pete Cooke, author of Tau Ceti, who is now working in splendid isolation on the sequel to be called Academy.



Nobody knows more about the risks of the computer games market than the professional programmer who works entirely alone. For Pete Cooke, writing Academy, the follow up to Tau Ceti, has represented five months of sustained effort and he won't know whether it's all been worthwhile until the game playing public has decided its commercial fate.

Worse still perhaps is the prospect of finding that even after months of programming, a game may be simply unworkable.

"You have to be extremely careful as a freelance programmer," said Pete. "If you've taken months to produce a game and it doesn't work then you are simply not going to be able to eat. I've never had a project that has crashed on me but it must be a devastating experience to find all that time's been eaten up for nothing."

Despite the risks Pete prefers working on his own. Being in total control has its compensations. "I've always worked on my own and I like it that way. You can work your own hours and there are no distractions. I can't imagine working in the same room as a group of programmers. I'd find it impossible to concentrate."

Formerly a maths teacher, Pete got into programming via a familiar route. "When the ZX81 came out I knew I had to get one so I answered one of those tiny adverts. The first one I got didn't work but the second one did and things took off from there."

After writing several games including a couple of adventures Pete attracted attention with the critically acclaimed Tau Ceti. Academy is a game in the same vein but could be considered as a 'prequel' rather than a sequel.



Skimming

"In Academy you are training to be a skimmer pilot and undertake missions similar to that of Tau Ceti. In order to pass your training you must complete 20 different missions. These will be loaded in blocks of four. The missions rise in difficulty the further you progress and you confront different planetary conditions and various enemies on each outing. Really it's like having 20 games in one.

"Each mission may require a different kind of skimmer so apart from three skimmers which are equipped and ready to go there are three additional ships which can be designed to your

the Academy

specifications. So as well as choosing which equipment you want there is also a skimmer ship designer so that using a cursor and pull down menu's you can place all the instruments as you want them in the cockpit console.

"As soon as your mission has been completed you are presented with your table of scores and you need an average score of 90% to progress to the next level. There are five levels and once you've completed the lot there's the chance to go back to the first level and increase your average score.

"One idea for the future is to release a mission designer or perhaps produce a batch of missions that can be incorporated into the game."

Pete's expertise has progressed since Tau Ceti and there are a number of enhancements.

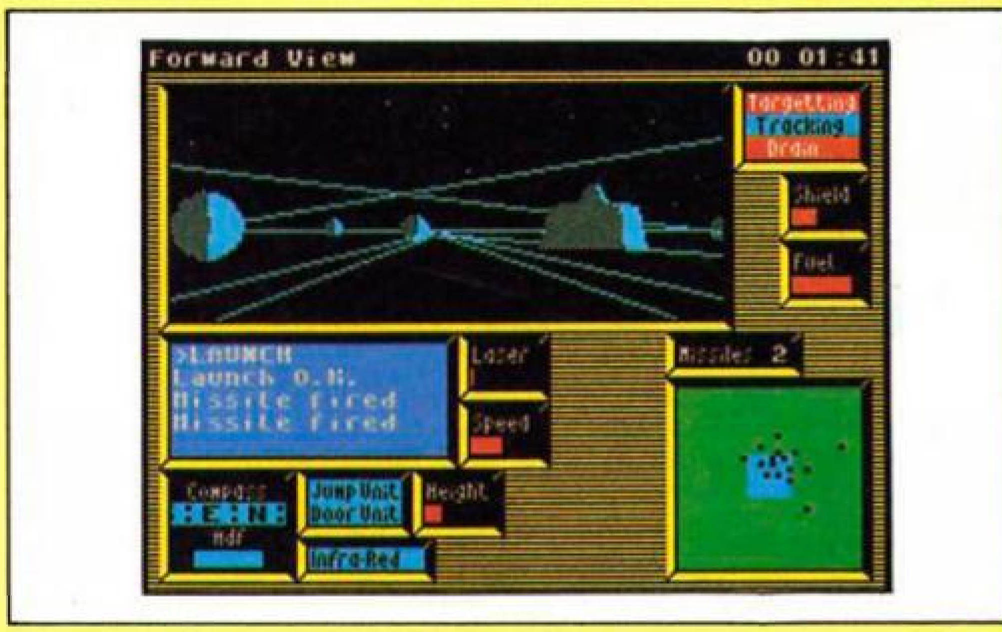
"There's a lot more to do, it's faster and the graphics include a lot more shading. in Tau Ceti there were two shades now there are four of which three can be used at any one time so everything is more detailed. There is more kit to take aboard the skimmer and of course now you can design your own. The program can deal with a lot more missions than before and there are a lot more objects and movement in the planet land-scapes."

Programming a game as complex as Academy presents its own special problems. "The most difficult thing is keeping the whole structure together so that everything interlocks properly. There are dozens of flags and each shape has 50 bits of information attached to it and you have to keep track of it all and make sure it all integrates."

In the shade

When designing a game Pete starts off with either a technical problem he wants to solve or an idea of a screen image he wants to create.

"Tau Ceti evolved from wanting to create shaded objects and shapes. Once that had been established there were already limitations to work within. The techniques I wanted to try dictated that the game would have to be on a planet surface."



Once the basic idea is set, the next major decision is the size of the display. "If you decide on a large screen display you are going to have to settle for slower processing as there is a larger overhead for each screen copy. If you look at scrolling games for instance they have a smaller screen to prevent taking up too much time with processing.

"With the screen display set you can then assess how much memory you have to play around with presentation. It's only at this stage that you can assess whether you can go for fancy menu's and pointers."

Juggling chunks of code is not a skill learnt without dedication and Pete has this advice for budding programmers. "Get some good books on programming, after that it's 99% perserverance. My bible was Rodney Zak's book, Programming the Z80 but almost any book on Z80 assembly will be of benefit. To get to grips with handling blocks of code you have to see the documentation — you can't do that just by looking at someone elses program."

Games by Pete Cooke
Invincible Island
Urban Upstart
Inferno
Up a Gumtree
Ski Star
Juggernaut
Tau Ceti
Room 10



SHORT CUTS

Keep the short routines coming in — there's £10 for each Short Cut published, and £20 for the month's Star Cut!

Screens

Philip Byford of Herts has come up with an alternative way of presenting loading screens. Once you have created a screen that you want to use at the start of your program SAVE it in the two sections as shown in program 1. This code can be included in your artwork program at the end of the drawing code, or used as written after a screen has been saved to tape from a drawing program. This needs to be stored AFTER program 2 which is your main loading program and would include a final line to LOAD "mainprog".

Program 1

```
   1 REM Special Loading Screen
   2 REM program 1
  10  LOAD "screen"SCREEN$
  20 SAVE "attr-file"CODE 22528,
768
  30 SAVE "disp-file"CODE 16384,
6144
```

Program 2

```
   1 REM Special Loading Screen
   2 REM program 2
  10 BORDER 0: POKE 23624,0: INK
 0: PAPER 0: CLS
  20 CLEAR 63999: RESTORE 70
  30 FOR n=65000 TO 65019
  40 READ d: POKE n,d
  60 NEXT n
  70 DATA 6,24,17,0,88,33,0,250,
14,32,126,18,19,35,13,32,251,16,
245,201
  80 LOAD "attr-file"CODE 64000,
768
  90 LOAD "disp-file"
 100 FOR n=0 TO 31
 110 POKE 65003,n: POKE 65006,n
 120 RANDOMIZE USR 65000
 130 PAUSE 2: NEXT n
 150 PAUSE 0: POKE 23624,7: INK
7: CLS
```

Upside down

Inverter is from **H. Shaw** of Ayreshire and causes all the characters to be printed upside down!

Enter the program and run it. The only message you should get is a 'return without GOSUB' error message, but don't panic, all is well, it is simply written in this form so that it can be MERGED into a program and called by a GO SUB 9900. Once this has been done then it can be switched on and off by using RANDOMIZE USR 64290/64335.

A program which caused much comment and confusion in our office when we left a Speccy in upside down mode for a while and just for the fun of it we make it our "Shortcut of the Month".

STAR CUT

Inverter

```
9900 CLEAR 64289
9902 FOR J=64290 TO 64339
9905 READ A: POKE J,A
9910 NEXT J
9915 RETURN
9920 DATA 17,0,61,33,95,252,6,96
9925 DATA 197,6,8,26,229,38,0,19
7
9930 DATA 6,8,23,203,28,16,251,1
24
9935 DATA 193,225,119,19,43,16,2
36
9940 DATA 1,16,0,9,193,16,226
9945 DATA 33,88,251,34,54,92,201
9950 DATA 33,0,60,24,247
9960 REM GOSUB 9900 TO ENTER MAC
HINE CODE
9965 REM RANDOMIZE USR 64290 TO
ACTIVATE
9970 REM RANDOMIZE USR 64335 TO.
RETURN TO NORMAL
9980 REM H. SHAW 1986
```

Cls

Peter Paul Hoogbrush sent these few lines to clear uyour screen rather classily. To use Call by RANDOMIZE USR 32000.

```
  10 DATA 1,255,2,33,0,88,62,23,
119,17,184,11,27,122,179,32,251,
62,63,119,35,11,120,177,32,236,2
53,54,83,56,62,2,205,1,22,205,10
7,13,201
  20 CLEAR 31999: LET a=0: FOR x
=32000 TO 32030: READ y: LET a=a
+y: POKE x,y: NEXT x: IF a<>3525
 THEN  PRINT "Error in Code"
```

Tips

Two very short cuts from **Paul Hemmingway** of Hull. First a short machine code routine to flash the whole screen without disturbing its contents.

Enter the following lines:

9000 FOR n=60000 TO 60017: READ a: POKE n,a: NEXT n
9010 DATA 33,0,88,1,192,2,62,128, 86,130,119,35,11,120,177,32,245, 201.

After this has been set up, either in a program or by RUNning it you cause the screen to flash by typing or using RANDOMIZE USR 60000, using it a second time reverts the screen to normal.

Next is a short routine to enable somone to enter a word without it being displayed, useful for entering a password or for two player games when the entry needs to be secret.

POKE 23609,255: POKE 23624,63: INPUT a$: POKE 23609,0: BORDER 7

If you require a different border colour during input then change the POKE 23624,63 to POKE 23624,9*colour required, and alter the BORDER colour.

Screen suite

David Knight is another regular contributor, and has supplied us with a suite of, not one, but EIGHT useful routines for screen manipulation.

These are all stored in the printer buffer and are set up as user defined functions in lines 1 to 8. Enter the program and run it, if all is well then save it when the program prompts you and delete lines 10 to 160 before saving the FM lines 1 to 8.

To use it in your own programs, LOAD in the code and merge in the FN lines by including a line **LOAD "FN CODE"CODE:MERGE" "** the two sets of code must, of course be on the tape after the main program. But what do they do?

1. *FN p(x,y)* — This function gives the colour of any pixel normally accessable by the BASIC POINT command. It returns a number between 0 and 7.
2. *FN w()* — To call use RANDOMIZE FN w(), and this command is used to wipe only the attributes with the current colours without affecting the rest of the screen.
3. *FN u(n)* — A rather more complex routine and only of use to those who are experienced programmers, it swaps between four banks of UDG's previously set up by the user. Called by RANDOMIZE FN u(n), n represents the UDG bank number from 1 to 4.
4. *FN v(address)* — This function reflects the character pointed to by the address, i.e. To reflect UDG graphic 'A' use RANDOMIZE FN v(USR "a").
5. *FN h(address)* — Reflect horizontally.
6. *FN c(address)* — Reflect clockwise.
7. *FN a(address)* — Reflect anticlockwise.
8. *FN i(address)* — Invert character.

```
   1 DEF FN p(x,y)=USR 23296
   2 DEF FN w()=USR 23485
   3 DEF FN u(n)=USR 23464
   4 DEF FN v(a)=USR 23358
   5 DEF FN h(a)=USR 23381
   6 DEF FN c(a)=USR 23389
   7 DEF FN a(a)=USR 23436
   8 DEF FN i(a)=USR 23444
  10 LET x=23296: LET ch1=0: LET
 ch2=0: FOR a=1 TO 7
  20 READ a$: FOR b=1 TO LEN a$
STEP 2
  30 LET high=CODE a$(b)-48-(39
AND a$(b)>"9"): LET ch1=ch1+high
  40 LET low=CODE a$(b+1)-48-(39
 AND a$(b+1)>"9"): LET ch2=ch2+l
ow
  50 POKE x,high*16+low: LET x=x
+1
  60 NEXT b: NEXT a
  70 IF ch1<>1077 OR ch2<>1575 T
HEN  PRINT "Error.": STOP
  80 SAVE "FN CODE"CODE 23296,20
5
 100 DATA "2a0b5c110400194e1e001
946cdaa224e477c1f1f1fe61fc650670
4791f10fd7e"
 110 DATA "30031f1f1fe6074fc9000
00000000000000002a0b5c110400195e2
3666bc9cd32"
 120 DATA "5b11315b0600e57e12231
b10fa13ebd10e00edb0c9cd5d5bcd3e5
b182fcd3e5b"
 130 DATA "cd325b112a5b0600c5703
2295b0600e53a295bc5477e1f10fdebc
b16eb23c110"
 140 DATA "efe113c110e2eb212a5b1
0c4cd5d5bcd5d5b10c9cd325b06007e2
f77231 0fac9"
 150 DATA "50ff60fd00feb0fecd325
b7d0721a05b5f160019117b5c010200e
db0c93a0d5c"
 160 DATA "2100580110159001ff0277e
db0c9"
```

When I'm 64

Ben Stragnell from Warwickshire presents a simple way of producing 64 characters to a line. Type in the listing and SAVE the code to tape when prompted. The code is completely relocatable and can be added to a program by including the line **CLEAR address—1:LOAD " " CODE address.**

The code is 144 bytes long and uses the UDG character U. To use it the variable s$ is reserved and should be set in the first line of our program to the maximum length of the message you will need PLUS 3 by a DIM statement. This is because it must be the first in the variables area of the computer. i.e. line 1 DIM s$(67).

Before calling the 64 print code you have to set up s$ by filling it with the data required in the format: **LET s$=CHR$ x+CHR$ y+"text to be printed"+CHR$ 128**

x is a value between 0 and 63 and is the horizontal coordinate

y is a value between 0 and 21 and is the vertical coordinate

Finally you include a line **PRINT AT 0,0;:LET anyvar=USR address** to print it.

```
   10 LET A$="2A4B5C7EFED3C001060
00956235E237AFE40380316001C7BFE1
6D07EFE80C8E5D51805D1E11418E6D62
0D821"
   20 LET A$=A$+"00006F0603CB25CB
1410FA11003D1911F8FF010800EDB021
F8FF06087E4F17B14F3E00C50604CB19
CB191F10F977C12310EAD1D57ACB3A30
1321F8FFBF06087EC506"
   30 LET A$=A$+"04CB3F10FC77C123
10F33E15D73E01D73E16D77BD77A"
   40 LET A$=A$+"D73EA4D73E15D73E
00D71893"
   41 LET CHKSM=0
   45 LET ADD=30000
   50 FOR N=1 TO LEN A$ STEP 2
   60 LET H=CODE A$(N)-48: IF H>9
 THEN  LET H=H-7
   70 LET L=CODE A$(N+1)-48: IF L
>9 THEN  LET L=L-7
   80 POKE ADD,H*16+L
   90 LET CHKSM=CHKSM+H*16+L
   95 LET ADD=ADD+1
  100 NEXT N
  110 IF CHKSM<>15165 THEN  PRINT
 AT 21,0;"ERROR IN CODE": BEEP 1
,0: STOP
  120 INPUT "NAME TO SAVE >"; LIN
E N$
  130 SAVE N$CODE 30000,144
  140 PRINT AT 21,0;"VERIFY...":
VERIFY N$CODE
```

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CROSSFIRE

Could this be the end of the Dot Crawl? A potential solution plus much more in this month's postbag.

Opus Discovery/ Microdrive

I am afraid I cannot help your correspondent Paul King with his problems with Omnicalc and Opus, but wonder whether anyone can help me with similar problems? There must be a lot of us about! I have little understanding of programming, and the mention of machine code makes me shudder!

*My time is spent **USING** programs, not creating them, and my time is money.*

I have a need to store a large number of addresses, classified into only a few categories, and OCP's Address Manager fits like a glove, expecially as the packing says it can be transferred to Microdrive. To me this meant Opus, and the loading and storting of files should be much quicker than from tape. Just the job! I transferred to Opus, and set up a short dummy file to test. NO LUCK. it flashes "Interface 1 not present" as me. The same problem occurs using Transexpress to transfer to Opus. HELP!

The same sort of problem occurs with Data Genie, which I was given as a present, and of which I dare admit no problem! Here I have achieved an apparently successful transfer, and indeed can save files of data to disc. But loading back from disc results in an error message "NONSENSE".

The producers of Data Genie tell me the program is compatible with Microdrive, but not Opus, and Opus tell me it has something to do with Hook Codes. Now I am lost with that jargon.

Although these problems don't detract too much from the Opus discovery, which I actually find great generally, I am a little miffed that the advice that "Programmes supplied on tape with instructions to convert them for use on the microdrive system should convert to disc in exactly the same way" (Opus manual page 10), doesn't match up to expectations.

Can anyone out there help me in here!?

T.G.Tyson, Chester

Dot Crawl

I have found a way of removing the colour signal which degrades the picture if you are using a monochrome TV or video. A tip I read in a magazine some time ago described how adding a capacitor to the Spectrum video circuitry killed off the colour oscillator; however I found that this gave a very 'noisy' display.

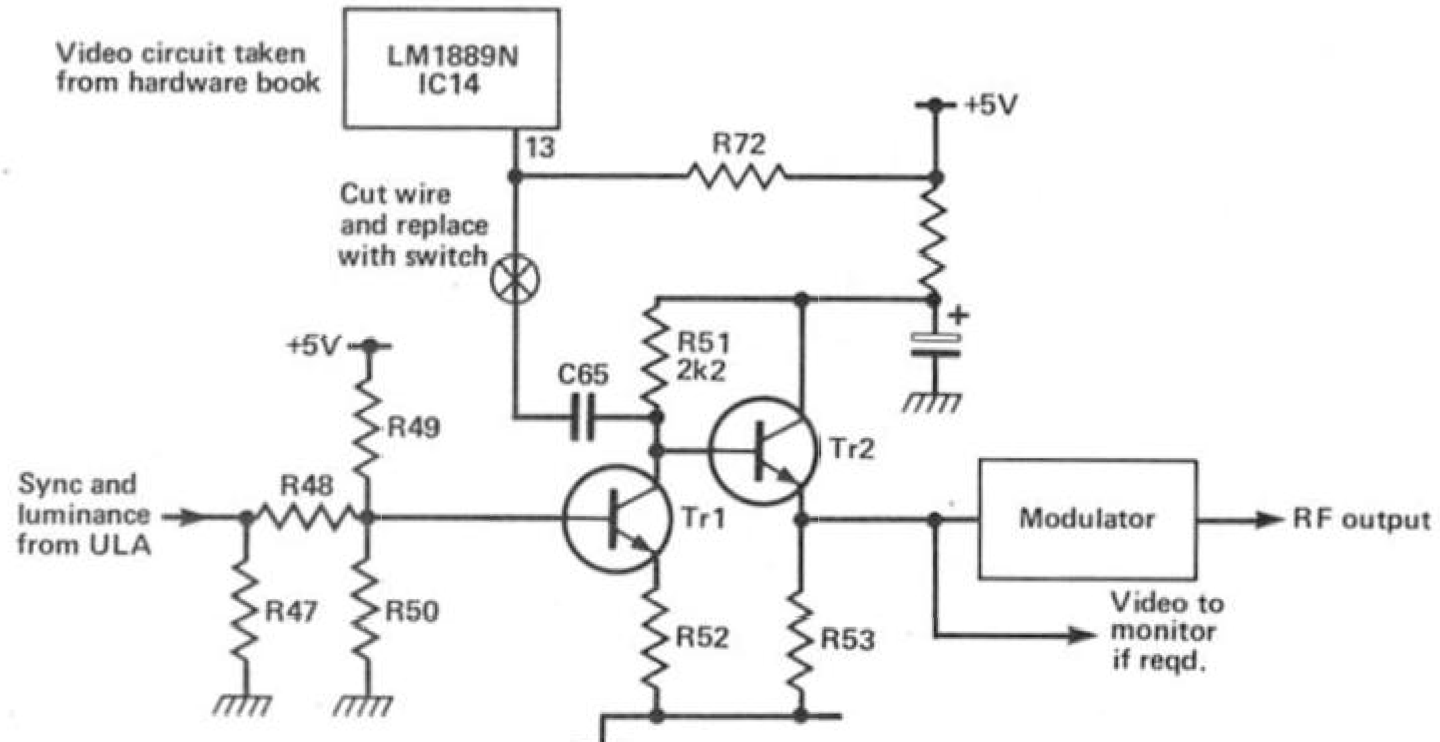
A better way is to simply disconnect the chrominance signal from the video mixer transistor. This can be done from the top of the PC board (so you don't have to remove the board to get at it) by cutting a capacitor leg on the left hand side (see diagram).

As the mod is very close to the side of the cse, you can use a sub-miniature toggle switch (with no long wires) to allow you to switch the colour signal on and off.

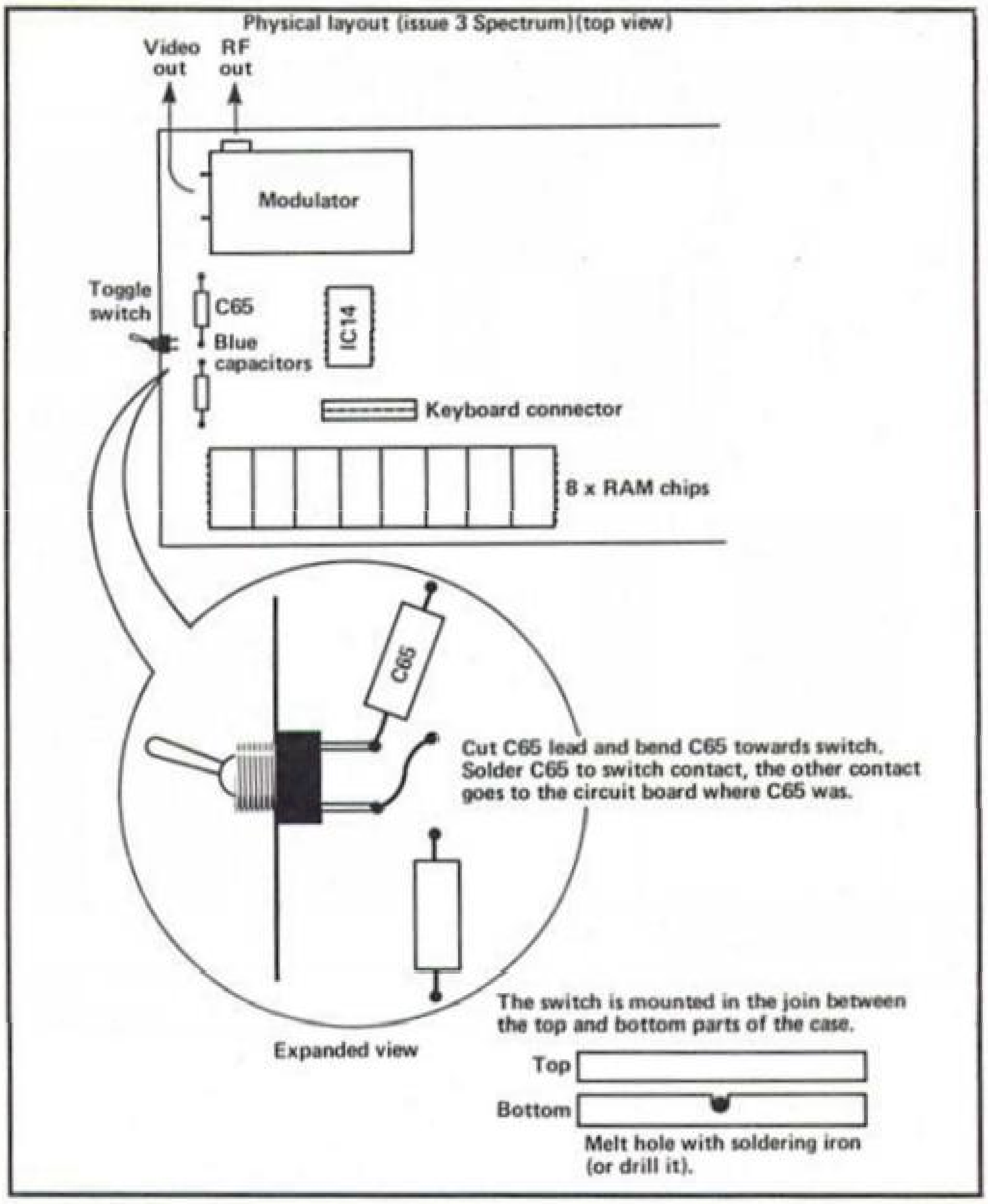
If you do this, you will find there is not 'dot crawl' or shimmering whatsoever; all colours appear as different shades of grey. It also removes the 2 inch wide vertical cross-cross pattern which seemed to be just visible when using a monitor.

P.A. Tipping, Todmorden

Colour killer mod. to remove dot-crawl



READERS' LETTERS



The 128 v 128+2

I am an over 60 computer nut who has just added a 128 to my collection, a Sinclair 128 that is, not the 128+2. I am constantly asked why as the Amstrad model is supposedly so much better. But is it?

The Amstrad model has a glued on tape recorder and no facilities to use any other. So if the recorder goes faulty you are without your computer. I know that does not affect me much as I mostly use Microdrives, but commercial utilities are on tape and some of the new ones take some loading.

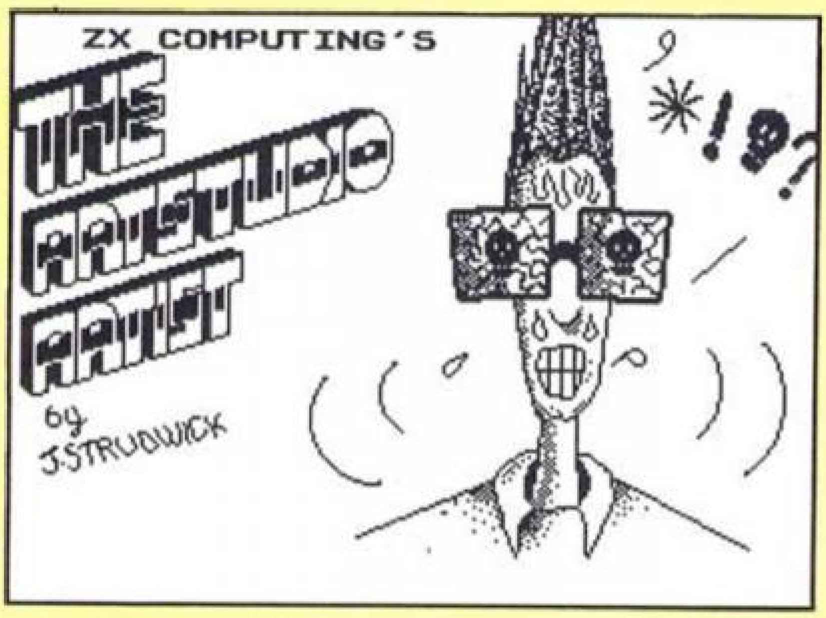
My man recorder is a Sanyo DR 101 dedicated to computers, it has mode and PH switch or with the PH pressed in it loads automatically. However it will not load some of the newer games.

Happily the recorder I use with my ZX81, an old clapped out Lloytron bought over ten years ago, will load those that refuse on the Sanyo. If Amstrad's 128 recorder won't load you've had it. There is not tape counter either so on a tape with multiple programs you've got a real job on your hands. I have tapes from C10 to C90, the larger tapes being necessary or else I would run out of shelf space.

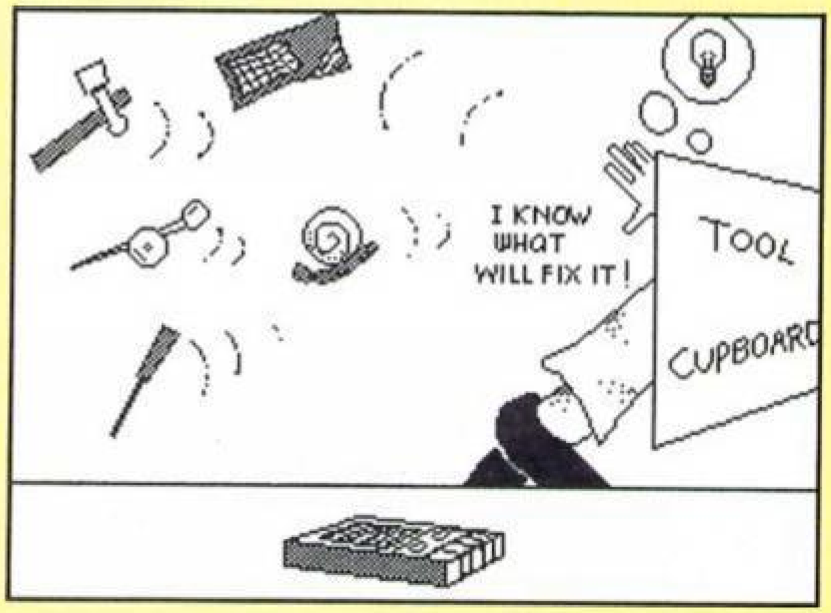
If you have an arthritic condition or problems with typing the keywords are a great help and having them printed on the keys is essential if you do a lot of programming rather than just games playing.

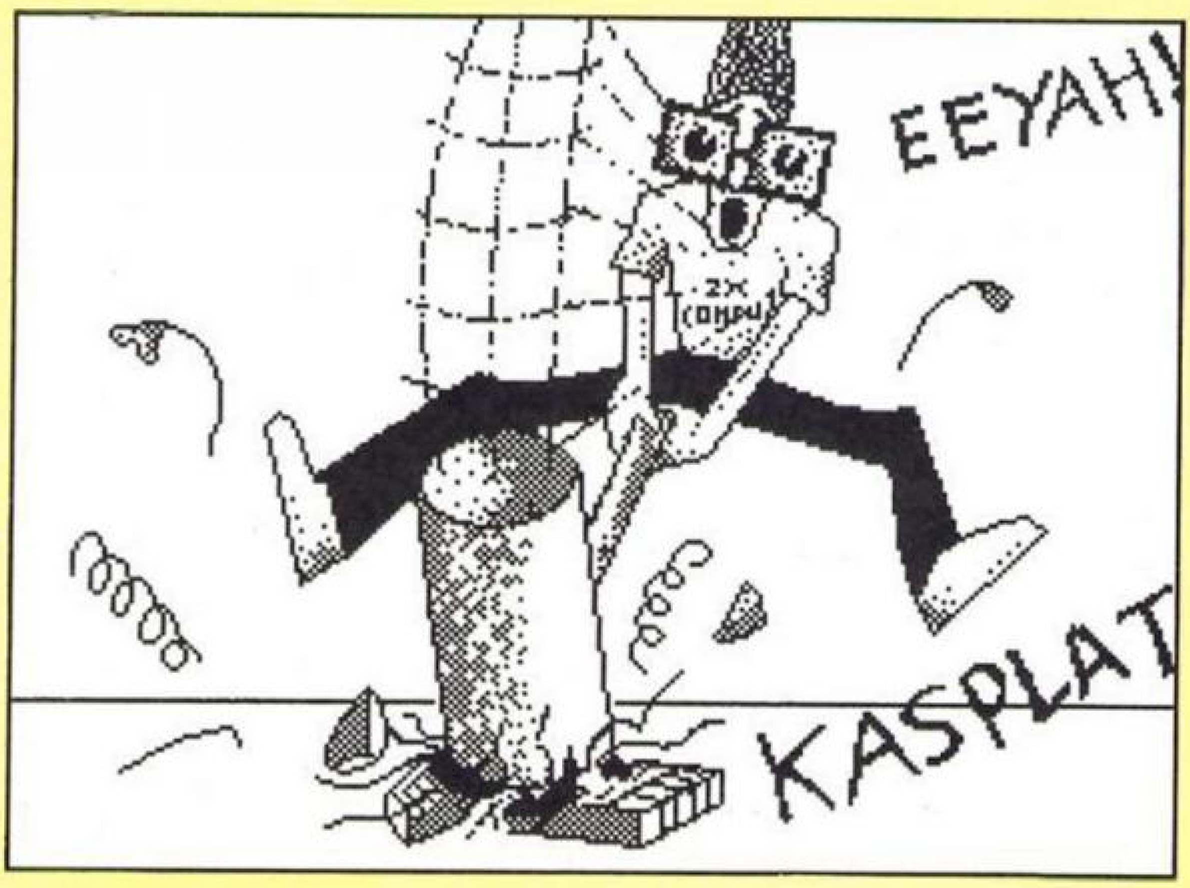
Having tried both the 128 and the 128+2 and read every available review on them both I opted for the 128 — but then I am not purely a games player and I like other aspects of computing as well.

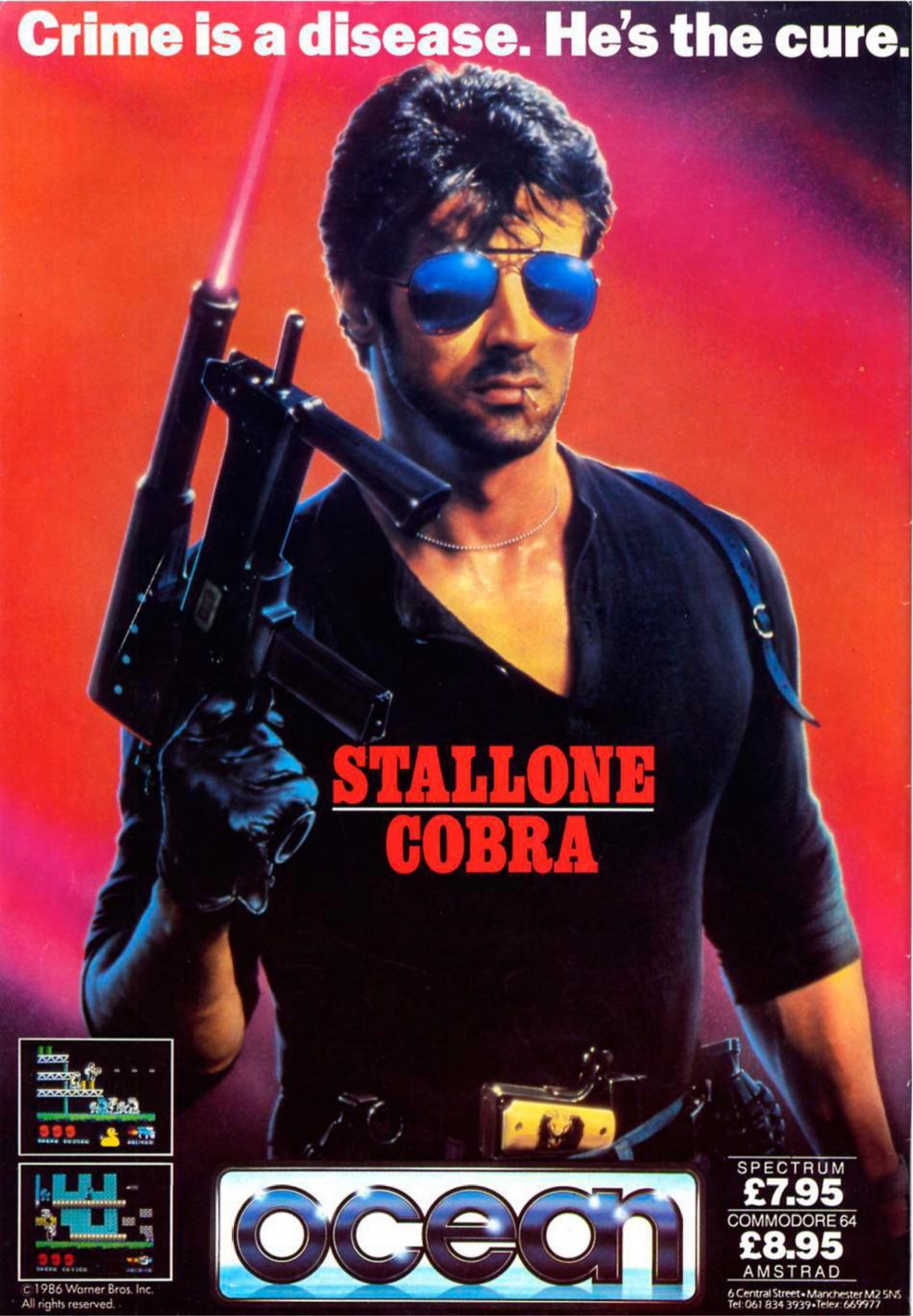
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